DCS 6000

User Manual

Digital Conference System

DCS 6000 Digital Infrared Wireless Language Distribution System

Danish Interpretation Systems **DIS**

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2 Important

2.1 Important Safeguards

Prior to installing or operating this product always read the Safety Instructions which are available as a separate document.

2.2 Installation precautions

Do not install the unit in a location near heat sources such as radiators or air ducts, or in a place exposed to direct sunlight, excessive dust or humidity, mechanical vibration or shock.

To avoid moisture condensations do not install the unit where the temperature may rise rapidly.

When the rechargeable battery pack is used, it is advisable to check regularly after three years that the batteries are not leaking. If there is any sign of leakage or corrosion, replace the battery pack. Ensure that only the battery pack BP 6001 is used. The battery pack has to be replaced at least every five years.

2.3 Cleaning

To keep the cabinet in its original condition, periodically clean it with a soft cloth. Stubborn stains may be removed with a cloth lightly dampened with a mild detergent solution. Never use organic solvents such as thinners or abrasive cleaners since these will damage the cabinet.

2.4 Repacking

Save the original shipping cardboard box and packing material; they will become handy if you ever have to ship the unit. For maximum protection, re-pack the unit as originally packed from the factory.

2.5 Warranty

The individual units in the DCS 6000 system are minimum covered by 12 months warranty against defects in materials or workmanship.

3 System description and planning

3.1 System overview

DCS 6000 Digital IR is a system for wireless distribution of audio signals via infra-red radiation. It can be used in a simultaneous interpretation system for international conferences where multiple languages are used.

To enable all participants to understand the proceedings, interpreters simultaneously translate the speaker's language as required. These interpretations are distributed throughout the conference venue, and delegates select the language of their choice and listen to it through headphones.

The DCS 6000 Digital IR system can also be used for music distribution (mono as well as stereo).

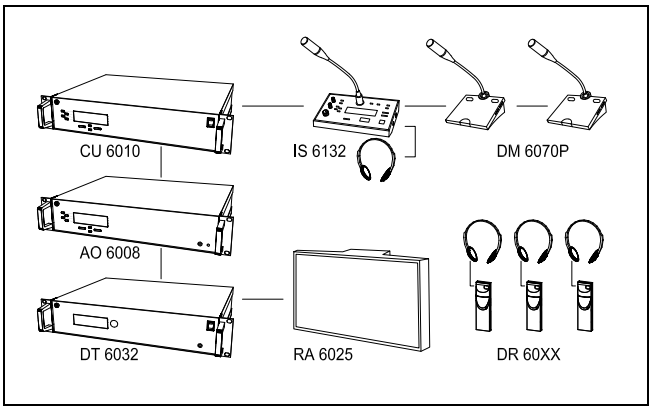


Figure 3.1-A DCS 6000 Digital IR system overview (with DCS 6000-system as input)

The DCS 6000 Digital IR Language Distribution System comprises one or more of the following:

3.1.1 Infra-red transmitter

The transmitter is the core of the DCS 6000 Digital IR system. Two types are available:

- DT 6008 with inputs for 8 audio channels
- DT 6032 with inputs for 32 audio channels

3.1.2 Infra-red radiators

Two types of radiators are available:

- RA 6013 medium-power radiator for small/ medium conference venues
- RA 6025 high-power radiator for medium/large conference venues

Both types can be switched between full and half power use. They can be mounted on walls, ceilings or floor stands.

3.1.3 Infra-red receivers

Three multi-channel infra-red receivers are available:

- DR 6004 for 4 audio channels
- DR 6008 for 8 audio channels
- DR 6032 for 32 audio channels

They can operate with a rechargeable NiMH battery pack or with disposable batteries. Charging circuitry is incorporated in the receiver.

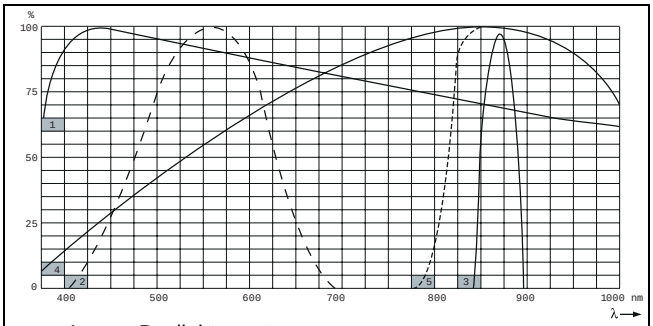
Note: The charging unit used for charging the receivers fitted with a rechargeable NiMH battery pack as well as the rechargeable battery pack will not be available before year 2006.

3.2 System technology

3.2.1 IR radiation

The DCS 6000 Digital IR system is based on transmission by modulated infra-red radiation. Infra-red radiation forms part of the electro-magnetic spectrum, which is composed of visible light, radio waves and other types of radiation. It has a wavelength just above that of visible light. Like visible light, it is reflected from hard surfaces, yet passes through translucent materials such as glass.

The infra-red radiation spectrum in relation to other relevant spectra is shown in Figure 3.2-A.



1 Daylight spectrum
2 Sensitivity of the human eye
3 IR radiator
4 Sensitivity of IR sensor
5 Sensitivity of IR sensor with daylight filter

Figure 3.2-A Infra-red radiation spectrum in relation to other spectra

3.2.2 Signal Processing

The DCS 6000 Digital IR system uses high frequency carrier signals (typically 2-8 MHz) to prevent interference problems with modern light sources (see section 3.3.3). The digital audio processing guarantees a constant high audio quality. The signal processing in the transmitter consists of the following main steps (see Figure 3.2-B):

1. **A/D conversion** - Each analogue audio channel is converted to a digital signal.
2. **Compression** - The digital signals are compressed to increase the amount of information that can be distributed on each carrier. The compression factor is also related to the required audio quality.
3. **Protocol Creation** - Groups of up to four digital signals are combined into a digital information stream. Extra fault algorithm information is added. This information is used by the receivers for fault detection and correction.
4. **Modulation** - A high frequency carrier signal is phase-modulated with the digital information stream.
5. **Radiation** – Up to 8 modulated carrier signals are combined and sent to the IR radiators, which convert the carrier signals to modulated infra-red light. In the IR receivers a reverse processing is used to convert the modulated infra-red light to separate analogue audio channels.

In the IR receivers a reverse processing is used to convert the modulated infra-red light to separate analogue audio channels.

3.2.3 Quality modes

The DCS 6000 Digital IR system can transmit audio in four different quality modes:

- Mono, conference quality, maximum 32 channels (standard quality)
- Mono, Hi FI quality, maximum 16 channels (premium quality)
- Stereo, conference quality, maximum 16 channels (standard quality)
- Stereo, Hi FI quality, maximum 8 channels (premium quality)

The conference quality mode uses less bandwidth and can be used for transmitting speech. For music the HI-FI quality mode gives near CD quality.

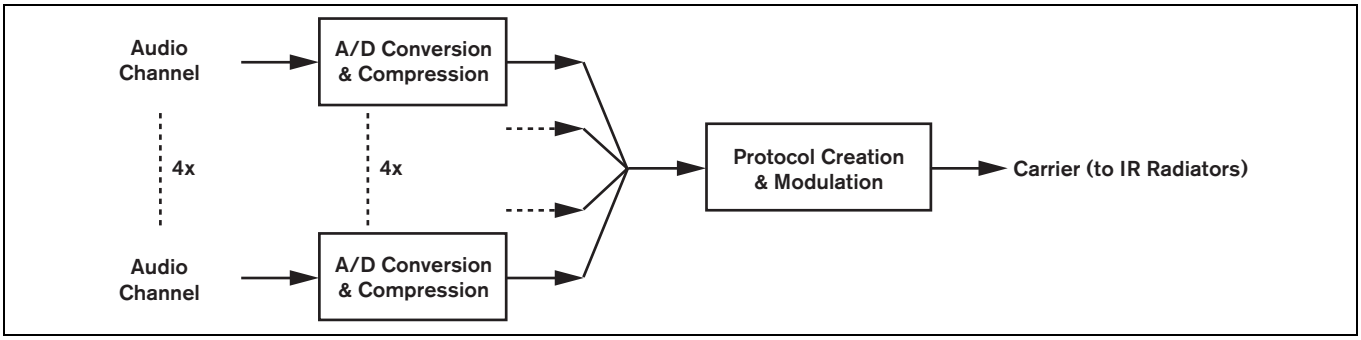


Figure 3.2-B Overview of the signal processing (for one carrier)

3.2.4 Carriers and channels

The DCS 6000 Digital IR system can transmit up to 8 different carrier signals (depending on the transmitter type). Each carrier can contain up to 4 different audio channels.

The maximum number of channels per carrier is dependent on the selected quality modes. Stereo signals use twice as much bandwidth as a mono signal, premium quality uses twice as much bandwidth as standard quality. Per carrier a mix of channels with different quality modes is possible, as long as the total available bandwidth is not exceeded.

The table below lists all possible channel combinations per carrier:

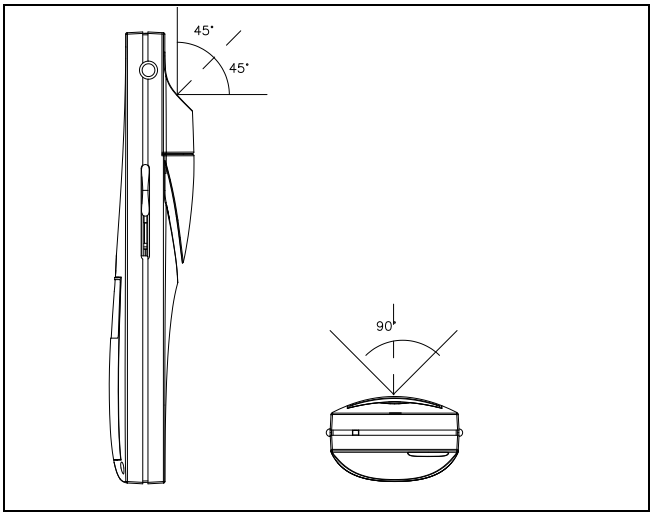


Figure 3.2-C Directional characteristics of the receivers

	Channel Quality				
	Mono Conference	**Mono Hi-Fi**	**Stereo Conference**	**Stereo Hi-Fi**	**Bandwidth**
Possible number of channels per carrier	4				4 x 10 kHz
	2	1			2 x 10 kHz and 1 x 20 kHz
	2		1		2 x 10 kHz and 1 x 10 kHz (left) and 1 x 10 kHz (right)
		1	1		1 x 20 kHz and 1 x 10 kHz (left) and 1 x 10 kHz (right)
			2		2 x 10 kHz (left) and 2 x 10 kHz (right)
		2			2 x 20 kHz
				1	1 x 20 kHz (left) and 1 x 20 kHz (right)

3.3 Aspects of infra-red distribution systems

A good infra-red distribution system ensures that all delegates in a conference venue receive the distributed signals without disturbance. This is achieved by using enough radiators, placed at well planned positions, so that the conference venue is covered with uniform Irradiation of adequate strength.

There are several aspects that influence the uniformity and quality of the infra-red signal, which must be considered when planning an infra-red radiation distribution system. These are discussed in the next sections.

3.3.1 Directional sensitivity of the receiver

The sensitivity of a receiver is at its best when it is aimed directly towards a radiator. The axis of maximum sensitivity is tilted upwards at an angle of 45 degrees (see Figure 3.2-C).

Rotating the receiver will decrease the sensitivity. For rotations of less than +/- 45 degrees this effect is not large, but for larger rotations the sensitivity will decrease rapidly.

3.3.2 The footprint of the radiator

The coverage area of a radiator depends on the number of transmitted carriers and the output power of the radiator. The coverage area of the RA 6025 radiator is twice as large as the coverage area of the RA 6013. The coverage area can also be doubled by mounting two radiators side by side. The total radiation energy of a radiator is distributed over the transmitted carriers. When more carriers are used, the coverage area gets proportionally smaller.

The receiver requires a strength of the IR signal of 4 mW/m2 per carrier to work without errors (resulting in a 80 dB S/N ratio for the audio channels). The effect of the number of carriers on the coverage area can be seen in Figure 3.3-A and Figure 3.3-B. The radiation pattern is the area within which the radiation intensity is at least the minimum required signal strength.

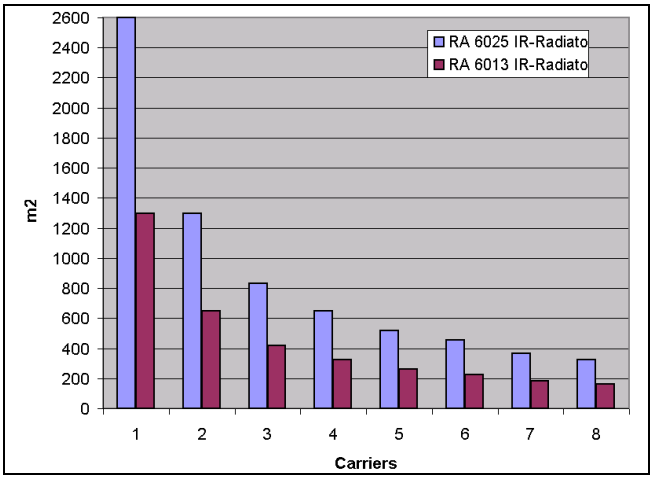


Figure 3.3-A Total coverage area of RA 6013 & RA 6025 for 1 to 8 carriers

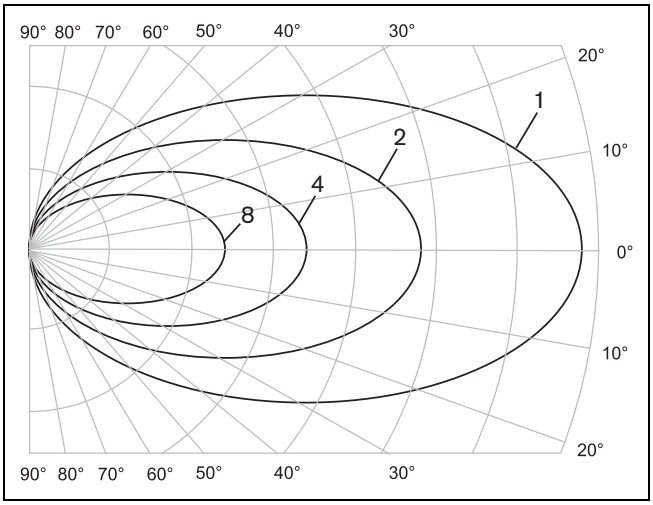


Figure 3.3-B Polar diagram of the radiation pattern for 1, 2, 4 & 8 carriers

The cross section of the 3-dimensional radiation pattern with the floor of the conference venue is known as the footprint (the white area in Figure 3.3-C to Figure 3.3-E).

This is the floor area in which the direct signal is strong enough to ensure proper reception, when the receiver is directed towards the radiator. As shown, the size and position of the footprint depends on the mounting height and angle of the radiator.

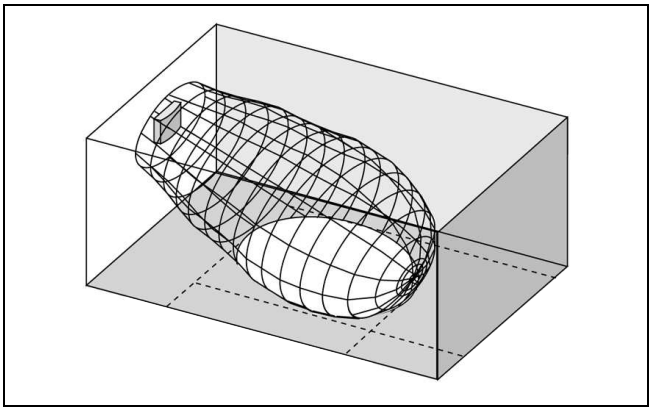


Figure 3.3-C The radiator mounted at 15° to the ce iling

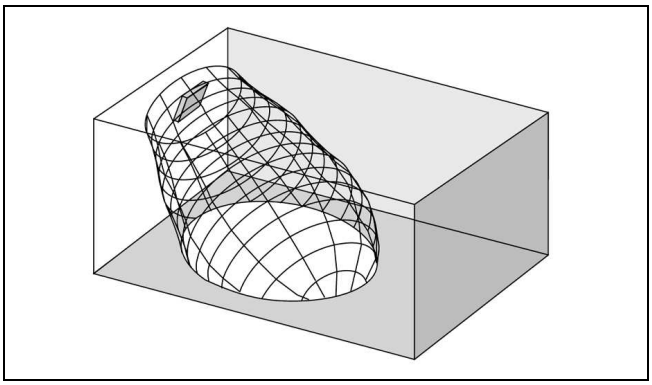


Figure 3.3-D The radiator mounted at 45° to the ce iling

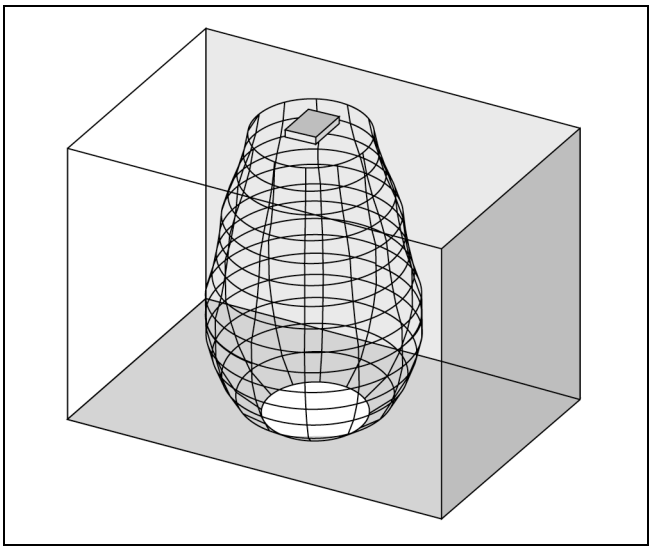


Figure 3.3-E The radiator mounted perpendicular (at 90°) to the ceiling

3.3.3 Ambient lighting

The DCS 6000 Digital IR system is practically immune for the effect of ambient lighting. Fluorescent lamps (with or without electronic ballast or dimming facility), such as TL lamps or energy saving lamps give no problems with the DCS 6000 Digital IR system. Also sunlight and artificial lighting with incandescent or halogen lamps up to 1000 lux give no problems with the DCS 6000 Digital IR system.

When high levels of artificial lighting with incandescent or halogen lamps, such as spotlights or stage lighting are applied, you should directly point a radiator at the receivers in order to ensure reliable transmission. For venues containing large, unscreened windows, you must plan on using additional radiators.

For events taking place in the open air a site test will be required in order to determine the required amount of radiators. With sufficient radiators installed, the receivers will work without errors, even in bright sunlight.

3.3.4 Objects, surfaces and reflections

The presence of objects in a conference venue can influence the distribution of infra-red light. The texture and colour of the objects, walls and ceilings also plays an important role.

Infra-red radiation is reflected from almost all surfaces. As is the case with visible light, smooth, bright or shiny surfaces reflect well. Dark or rough surfaces absorb large proportions of the infra-red signal (see Figure 3.3-F). With few exceptions it cannot pass through materials that are opaque to visible light.

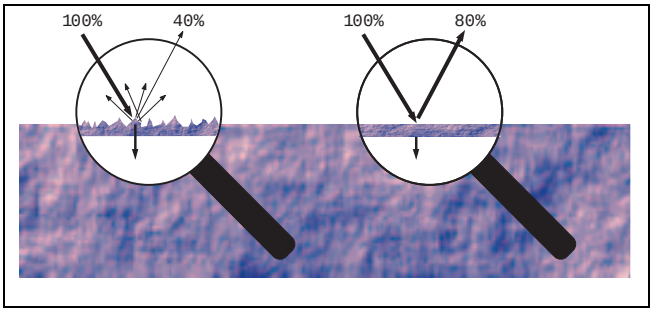


Figure 3.3-F The texture of the material determines how much light is reflected and how much is absorbed

Problems caused by shadows from walls or furniture can be solved by ensuring that there are sufficient radiators and that they are well positioned, so that a strong enough infra-red field is produced over the whole conference area. Care should be taken not to direct radiators towards uncovered windows, as most of this radiation will subsequently be lost.

3.3.5 Positioning the radiators

Since infra-red radiation can reach a receiver directly and/or via diffused reflections, it is important to take this into account when considering the positioning of the radiators. Though it is best if receivers pick up direct path infra-red radiation, reflections improve the signal reception and should therefore not be minimised. Radiators should be positioned high enough not to be blocked by people in the hall (see Figure 3.3-G and Figure 3.3-H).

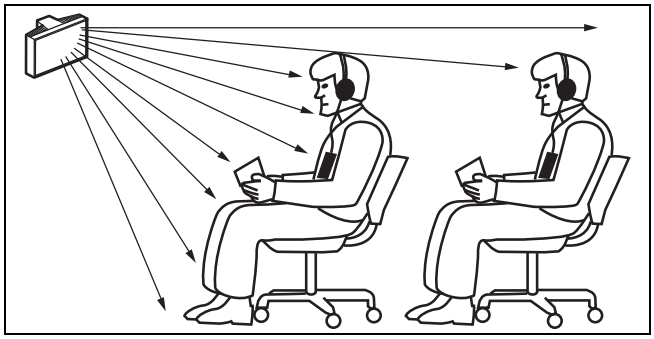


Figure 3.3-G Infra-red signal blocked by a person in front of the participant

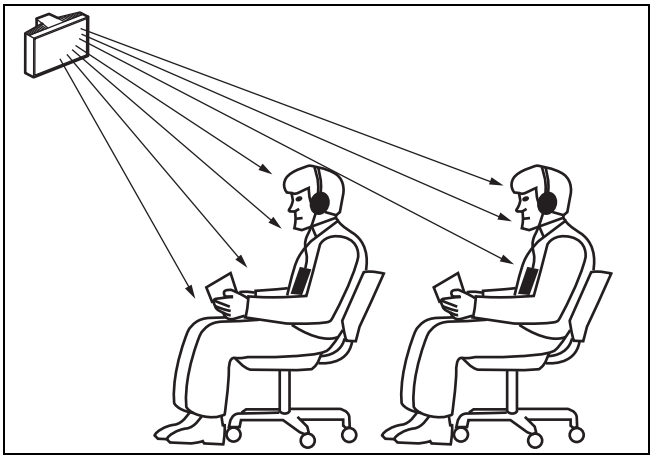


Figure 3.3-H Infra-red signal not blocked by a person in front of the participant

The figures below illustrate how infra-red radiation can be directed to conference participants. In Figure 3.3-I, the participant is situated clear from obstacles and walls, so a combination of direct and diffused radiation can be received. Figure 3.3-J shows the signal being reflected from a number of surfaces to the participant.

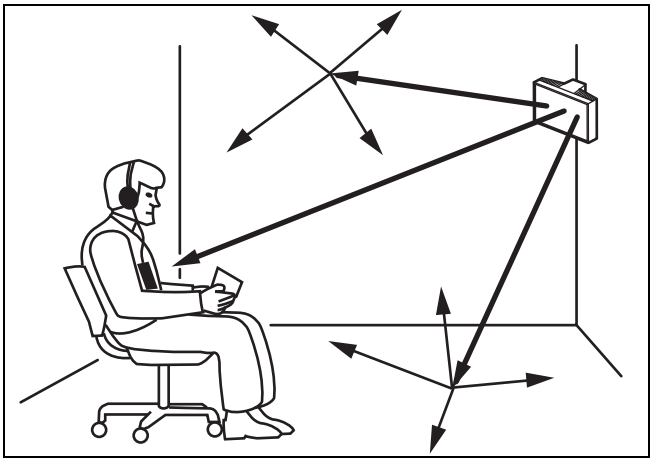


Figure 3.3-I Combination of direct and reflected radiation

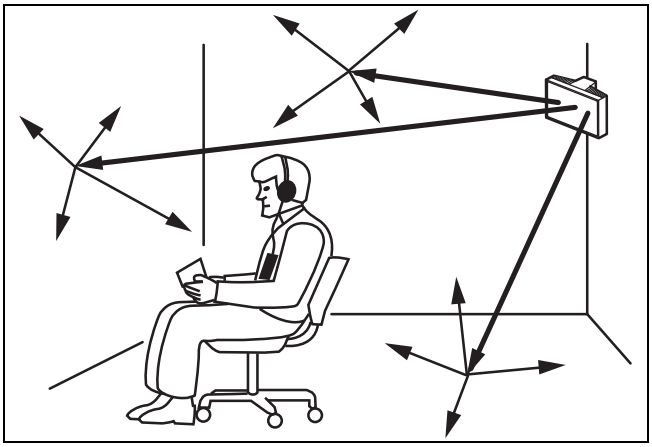


Figure 3.3-J Combination of several reflected signals

For concentrically arranged conference rooms, centrally placed, angled radiators located high up can cover the area very efficiently. In rooms with few or no reflecting surfaces, such as a darkened film-projection room, the audience should be covered by direct path infra-red radiation from radiators positioned in front.

When the direction of the receiver changes, e.g. with varying seat arrangements, mount the radiators in the corners of the room (see Figure 3.3-K). If the audience is always directed towards the radiators, you do not need radiators at the back (see Figure 3.3-L).

If the path of the infra-red signals is partially blocked, e.g. under balconies, you should cover the 'shaded' area with an additional radiator (see Figure 3.3-M). The figures below illustrate the positioning of the radiators:

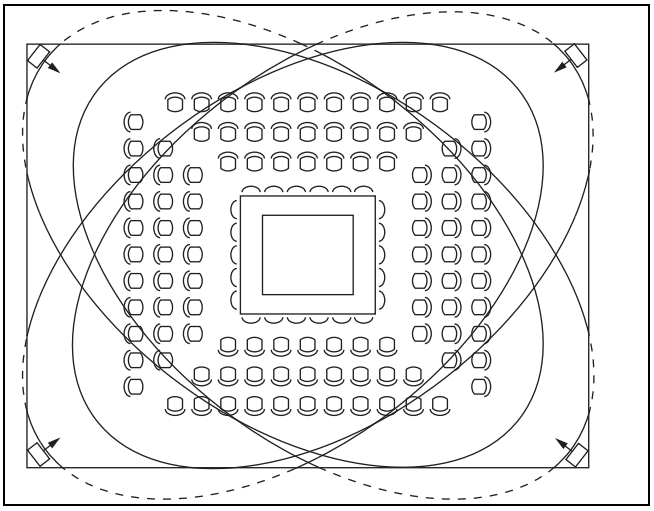


Figure 3.3-K Radiator position for covering seats in a square arrangement

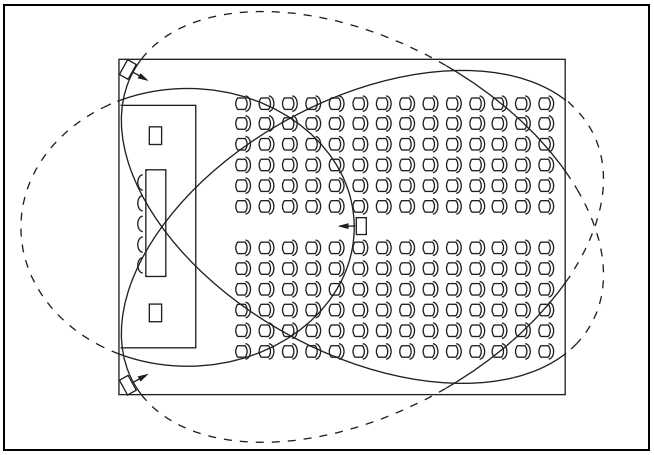


Figure 3.3-L Radiator positioning in a conference hall with auditorium seating and podium

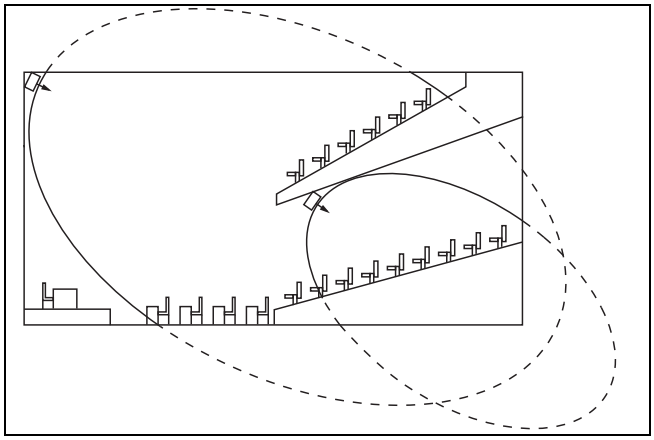


Figure 3.3-M Radiator for covering seats beneath a balcony

3.3.6 Overlapping footprints and multipath effects

When the footprints of two radiators partly overlap, the total coverage area can be larger than the sum of the two separate footprints. In the overlap area the signal radiation power of two radiators are added, which increases the area where the radiation intensity is larger than the required intensity.

However, differences in the delays of the signals picked up by the receiver from two or more radiators

can result in that the signals cancel each other out (multi path effect). In worst-case situations this can lead to a loss of reception at such positions (black spots).

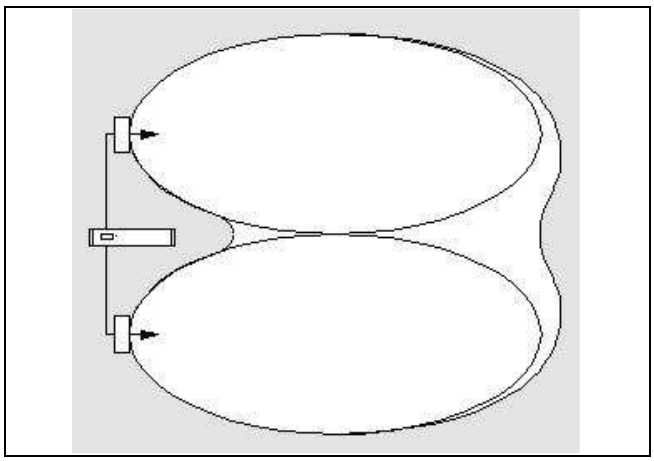


Figure 3.3-N Increased coverage area caused by added radiation power

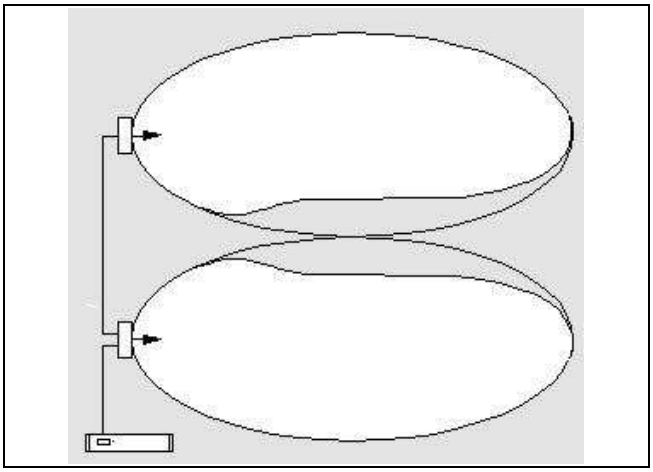


Figure 3.3-O Reduced coverage area caused by differences in cable signal delay

Figure 3.3-N and Figure 3.3-O illustrate the effect of overlapping footprints and differences in signal delays. The lower the carrier frequency, the less susceptible the receiver is for differences in signal delays. The signal delays can be compensated by using the delay compensation switches on the radiators (see section 3.5).

3.4 Planning an DCS 6000 Digital infra-red radiation system

3.4.1 Rectangular footprints

Determining the optimal number of infra-red radiators required to give 100% coverage of a hall can normally only be done by performing a site test. However, a good estimation can be made by using ‘guaranteed rectangular footprints’.

Figure 3.4-A and Figure 3.4-B show what is meant by a rectangular footprint. As can be seen, the rectangular footprint is smaller than the total footprint. Note that in Figure 3.4-B the ‘offset’ X is negative because the radiator is actually mounted beyond the horizontal point at which the rectangular footprint starts.

The guaranteed rectangular footprints for various number of carriers, mounting heights and mounting

angles can be found in section 10.8. The height is the distance from the reception plane and not from the floor.

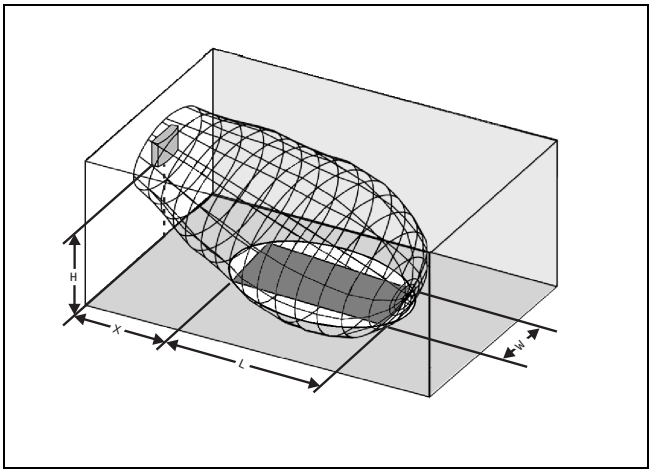


Figure 3.4-A A typical rectangular footprint for a mounting angle of 15°

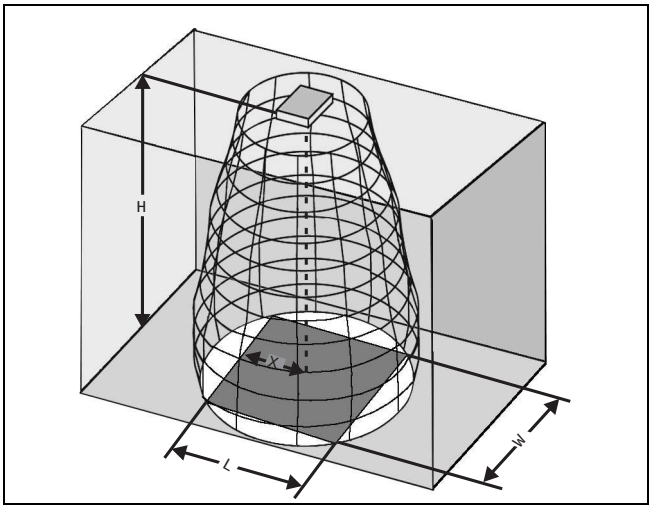


Figure 3.4-B A typical rectangular footprint for a mounting angle of 90°

Guaranteed rectangular footprints can also be calculated with the footprint calculation tool (available on the documentation CD-ROM). The given values are for one radiator only, and therefore do not take into consideration the beneficial effects of overlapping footprints. The beneficial effects of reflections are also not included. As rule of thumb can be given for systems with up to 4 carriers, that if the receiver can pick up the signal of two adjacent radiators the distance between these radiators can be increased by a factor 1.4 approximately (see Figure 3.4-C).

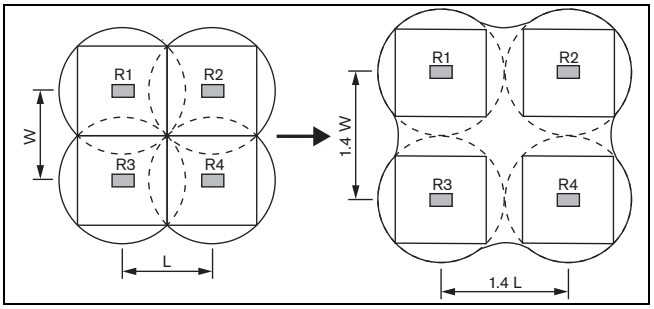


Figure 3.4-C The effect of overlapping footprints

3.4.2 Planning radiators

Use the following procedure to plan the radiators:

1. Follow the recommendations in section 3.3 in order to determine the positioning of the radiators.
2. Look up (in the table) or calculate (with the Footprint Calculation Program DIS_FCPv5.3_.xlt) the applicable rectangular footprints.
3. Draw the rectangular footprints in the lay-out of the room.
4. If the receiver can pick up the signal of two adjacent radiators in some areas, determine the overlap effect and draw the footprint enlargement(s) in the lay-out of the room.
5. Check whether you have sufficient coverage with the radiators at the intended positions.
6. If not so, add additional radiators to the room.

See Figure 3.3-K, Figure 3.3-L and Figure 3.3-M for examples of a radiator lay out.

Tip: The Footprint Calculation Program DIS_FCPv5.3_.xlt eases the work planning radiator coverage. The Program is to be found at the 'DCS 6000 Digital IR System User Manual CD'

3.4.3 Cabling

Signal delay differences can occur due to differences in the cable length from the transmitter

to each radiator. In order to minimize the risk of black spots, use equal cable length from transmitter to radiator if possible (see Figure 3.4-D). When radiators are loop-through connected, the cabling between each radiator and the transmitter should be as symmetrical as possible (see Figure 3.4-E and Figure 3.4-F). The differences in cable signal delays can be compensated with the signal delay compensation switches on the radiators.

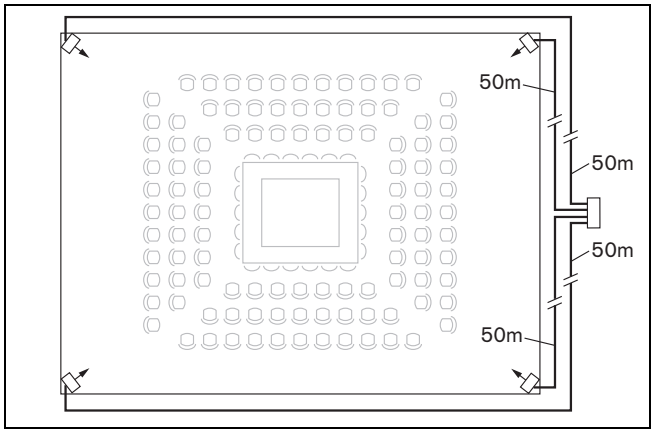


Figure 3.4-D Radiators with equal cable length

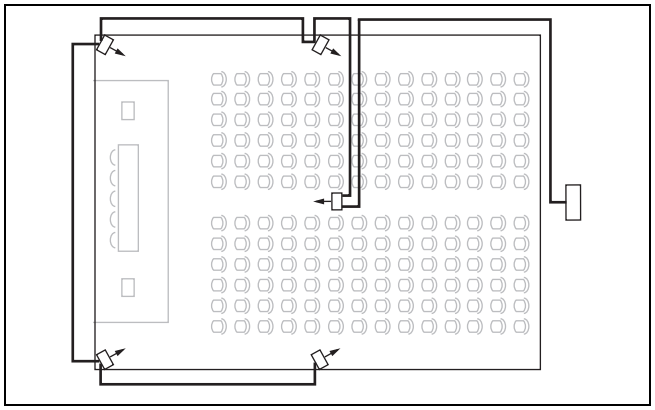


Figure 3.4-E Asymmetrical arrangement of radiator cabling (to be avoided)

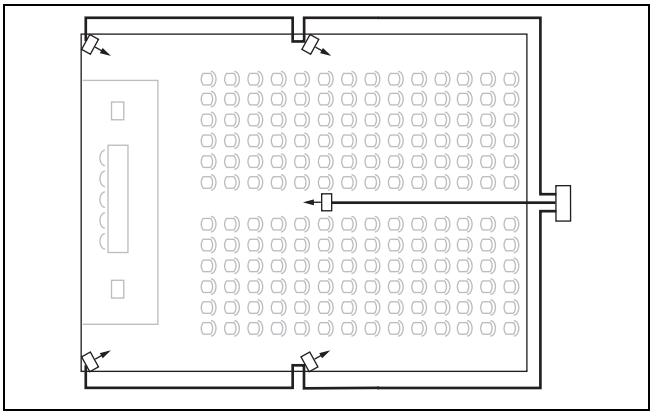


Figure 3.4-F Symmetrical arrangement of radiator cabling (recommended)

3.5 Setting the radiator delay switches

As described in section 3.3.6, differences in the delays of the signals picked up by the receiver from two or more radiators can cause black spots as a result of the multi path effect. The signals picked up by the receiver are delayed by:

- the transmission from transmitter to radiator through the cable (cable signal delay)
- the transmission from radiator to receiver through the air (radiation signal delay)
- for systems with two or more transmitters: the transmission through the slave transmitter(s)

To compensate the signal delay differences, the delay of each radiator can be increased. These signal delays can be set with the delay switches at the back of the radiator.

The cable signal delays can be determined in the following two ways:

- by measuring the cable lengths
- by measuring the impulse response time with a delay measurement tool

In both cases the cable signal delays can be calculated manually and with the delay switch calculation tool (available on the documentation CD-ROM). It is not necessary to calculate the cable signal delay in case:

- the radiators are directly connected to the transmitter with equal cable length;
- radiators are loop-through connected, but with less than 5 m distance between the first and last radiator in a trunk, and with equal cable length between the first radiator in each trunk and the transmitter.

In these cases set the delay switches on all radiators to zero and determine whether to compensate for radiation signal delay (see section 3.5.3).

The next sections describe how to calculate the delay switch positions manually for systems with one transmitter, or two or more transmitters. See the delay switch calculation tool for the procedures how to calculate the delay switch positions automatically.

Tip: The Delay Switch Calculation tool DIS_DSCv5.3a_.XLT eases the calculation of the delay switch positions. The Program is to be found at the 'DCS 6000 Digital IR System User Manual CD'.

3.5.1 System with one transmitter

3.5.1.1 Determining delay switch positions by measuring the cable lengths

Use the following procedure to determine the delay switch position based on cable lengths:

1. Look up the cable signal delay per meter of the used cable. The manufacturer specifies this factor.
2. Measure the lengths of the cables between the transmitter and each radiator.
3. Multiply the lengths of the cables between the transmitter and each radiator with the cable signal delay per meter. These are the cable signal delays for each radiator.
4. Determine the maximum signal delay.
5. Calculate for each radiator the signal delay difference with the maximum signal delay.
6. Divide the signal delay difference by 33. The rounded off figure is the signal delay switch position for that radiator.
7. Add delay switch positions for radiators under a balcony, if applicable (see section 3.5.3).
8. Set the delay switches to the calculated switch positions.

Caution: Turn the delay switches carefully to a new position until you feel that it clicks into position, to prevent that a switch is positioned between two numbers, which would result in a wrong delay setting.

Note: For systems with a cable length difference of more than 50 meters, it is recommended to use a measurement tool to determine the delay differences in order to calculate the delay switch positions.

Figure 3.5-A and Table 3.5-1 illustrate the calculation of the cable signal delay.

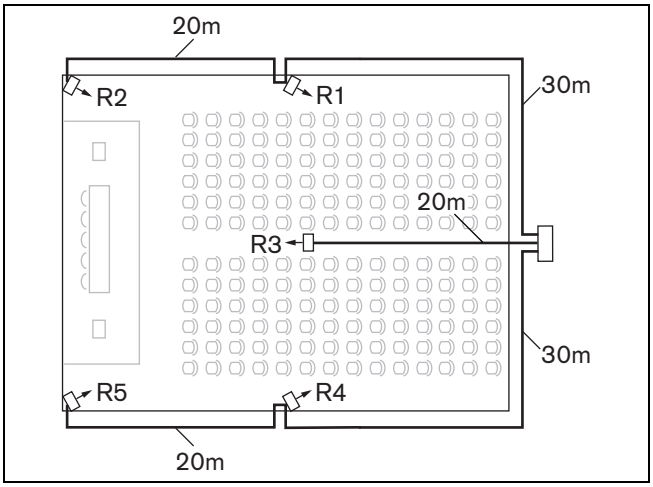


Figure 3.5-A System with five radiators and measured cable lengths

Note: The used cable signal delay per meter is an example. Use the actual signal delay per meter in this calculation as specified by the manufacturer.

Caution: Turn the delay switches carefully to a new position until you feel that it clicks into position, to prevent that a switch is positioned between two numbers, which would result in a wrong delay setting.

Table 3.5-1 Calculation of the cable signal delays

Radiator number	Total cable length [m]	Cable signal delay per meter [ns/m]	Cable signal delay [ns]	Signal delay difference [ns]	Delay switch position
1	30	5,6	30*5.6 = 168	280-168 = 112	112/33 = 3.39 = 3
2	30+20 = 50	5,6	50*5.6 = 280	280-280 = 0	0/33 = 0
3	20	5,6	20*5.6 = 112	280-112 = 168	168/33 = 5.09 = 5
4	30	5,6	30*5.6 = 168	280-168 = 112	112/33 = 3.39 = 3
5	30+20 = 50	5,6	50*5.6 = 280	280-280 = 0	0/33 = 0

3.5.1.2 Determining delay switch positions by using a delay measuring tool

The most accurate way to determine the cable signal delays is to measure the actual signal delay for each radiator as described in the following procedure:

1. Disconnect the cable from a radiator output of the transmitter and connect this to a delay measurement tool.
2. Disconnect a radiator from this cable.
3. Measure the impulse response time (in ns) of the cable(s) between the transmitter and the radiator.
4. Reconnect the cable to the radiator and repeat steps 2 to 4 for the other radiators that are connected to the same transmitter output.
5. Reconnect the cable to the transmitter and repeat step 1 to 5 for the other radiator outputs of the transmitter.
6. Divide the impulse response times for each radiator by two. These are the cable signal delays for each radiator.
7. Determine the maximum signal delay.
8. Calculate for each radiator the signal delay difference with the maximum signal delay.
9. Divide the signal delay difference by 33. The rounded off figure is the delay switch position for that radiator.
10. Add delay switch positions to radiators under a balcony, if applicable (see section 3.5.3)

Set the delay switches to the calculated delay switch positions.

Figure 3.5-B and Table 3.5-2 illustrate the calculation of the signal delays and the delay switch positions.

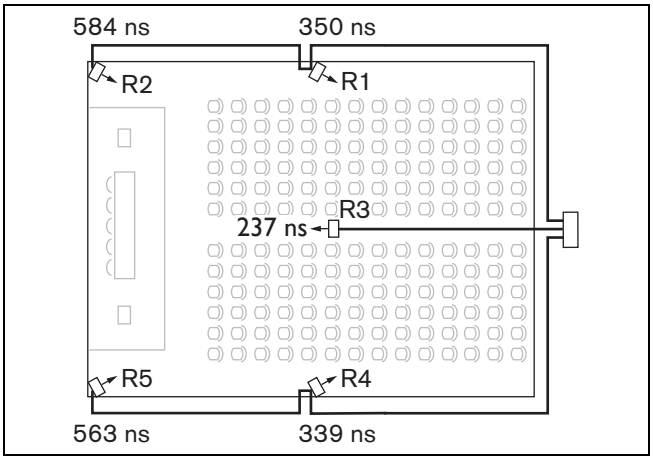


Figure 3.5-B Calculation System with five radiators and measured impulse response times

Note The calculated delay switch positions based on impulse response time can differ from the calculated delay switch positions based on cable lengths. This is caused by the accuracy of the measurements and the accuracy of the cable signal delay factor per meter as specified by the manufacturer of the cable. If the impulse response time is measured correctly, the calculated delay switch positions will be the most accurate.

Table 3.5-2 Calculation of the delay switch positions of a system with one transmitter

Radiator number	Impulse response time [ns]	Cable signal delay [ns]	Signal delay difference [ns]	Delay switch position
1	350	350/2 = 175	292-175 = 117	117/33 = 3.54 = 4
2	584	584/2 = 292	292-292 = 0	0/33 = 0
3	237	237/2 = 118	292-118 = 174	174/33 = 5.27 = 5
4	339	339/2 = 169	292-169 = 123	123/33 = 3.73 = 4
5	563	573/2 = 281	292-281 = 11	11/33 = 0.33 = 0

3.5.2 System with two or more transmitters in one room

When radiators in one multi purpose room are connected to two transmitters, an extra signal delay is added by:

- Transmission from master transmitter to slave transmitter (cable signal delay).
- Transmission through the slave transmitter.

Use the following procedure to determine the delay switch positions in a master-slave configuration:

1. Calculate the cable signal delay for each radiator, using the procedures for a system with one transmitter.
2. Calculate the signal delay of the cable between the master and the slave transmitter in the same way as for cables between a transmitter and a radiator.
3. Add to the cable signal delay of the cable between the master and the slave, the delay of the slave transmitter itself: 33 ns. This gives the master-to slave signal delay.
4. Add the master-to-slave signal delay to each radiator connected to the slave transmitter.
5. Determine the maximum signal delay.
6. Calculate for each radiator the signal delay difference with the maximum signal delay.
7. Divide the signal delay difference by 33. The rounded off figure is the signal delay switch position for that radiator.
8. Add delay switch positions to radiators under a balcony, if applicable (see section 3.5.3)
9. Set the delay switches to the calculated delay switch positions

Note: When a master-slave configuration is used for rooms which are always separated, the delay switch positions can be determined per system and the delay caused by transmission from master to slave transmitter can be ignored.

Caution: Turn the delay switches carefully to a new position until you feel that it clicks into position, to prevent that a switch is positioned between two numbers, which would result in a wrong delay setting.

Figure 3.5-C, Table 3.5-1, Table 3.5-3 and Table 3.5-4 illustrate the calculation of the extra master-slave signal delay.

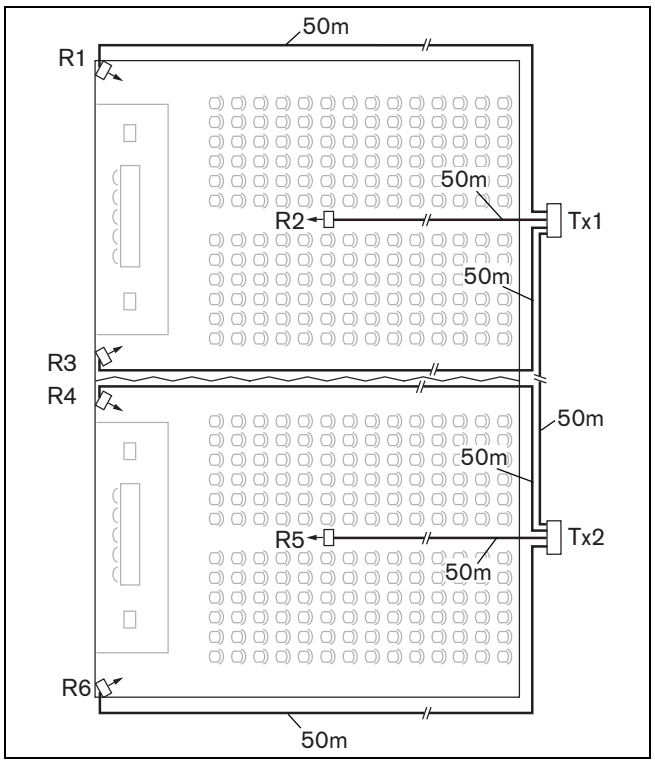


Figure 3.5-C System with master and slave transmitter in multi purpose room

Table 3.5-3 Calculation of the master-to-slave signal delays

Cable length master-slave transmitter [m]	Cable signal delay per meter [ns/m]	Cable signal delay [ns]	Signal delay slave transmitter [ns]	Master-to-slave signal delay [ns]
50	5,6	50 x 5.6 = 280	33	280 + 33 = 313

Table 3.5-4 Calculation of the delay switch positions of a system with two transmitters

Radiator number	Transmitter	Master-to-slave signal	Cable signal delay per meter [ns/m]	Cable signal delay [ns]	Signal delay difference [ns]	Delay switch position
1	Master	0	168	0+168 = 168	593-168 = 425	425/33 = 12.88 = 13
2	Master	0	280	0+280 = 280	593-280 = 313	313/33 = 9.48 = 9
3	Master	0	112	0+112 = 112	593-112 = 481	481/33 = 14.58 = 15
4	Master	0	168	0+168 = 168	593-168 = 425	425/33 = 12.88 = 13
5	Master	0	280	0+280 = 280	593-280 = 313	313/33 = 9.48 = 9
6	Slave	313	168	313+168 = 481	593-481 = 112	112/33 = 3.39 = 3
7	Slave	313	280	313+280 = 593	593-593 = 0	0/33 = 0
8	Slave	313	112	313+112 = 425	593-425 = 168	168/33 = 5.09 = 5
9	Slave	313	168	313+168 = 481	593-481 = 112	112/33 = 3.39 = 3
10	Slave	313	280	313+280 = 593	593-593 = 0	0/33 = 0

3.5.3 System with more than 4 carriers and a radiator under a balcony

Figure 3.5-D illustrates a situation in which a radiation signal delay occurs and which can be compensated for. For systems with more than four carriers, add one delay switch position per 10 meter (33 feet) difference in signal path length to the radiators which are closest to the overlapping coverage area. In Figure 3.5-D the signal path length difference is 12 meter. Add one delay switch position to the calculated switch position(s) for the radiator(s) under the balcony.

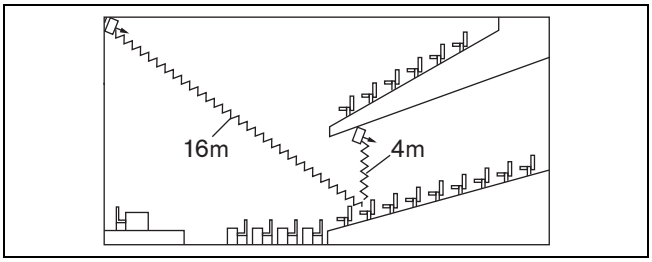


Figure 3.5-D Radiation path length difference for two radiators

3.6 Testing the coverage area

An extensive reception quality test must be done to make sure that the whole area is covered with IR radiation of adequate strength and that there are no black spots. Such a test can be done in two ways:

3.6.1 Testing during installation

1. Check that all radiators are connected and powered up and that no loose cables are connected to a radiator. Switch the transmitter off and on to re-initialise the auto equalisation of the radiators.
2. Set the transmitter in the Test-mode (see section 4.5.7). For each channel, a different test tone frequency will be transmitted.
3. Set a receiver on the highest available channel and listen via the headphones to the transmitted test tone.
4. Test all positions and directions (see next paragraph).

3.6.2 Testing during a meeting

1. Set a receiver in the Test-mode and select the highest available carrier. The quality of the received carrier signal is indicated on the display of the receiver (see section 6.3).
2. Test all positions and directions (see next paragraph). The quality indication should be between 00 and 39 (good reception).

3.6.3 Testing all positions and directions

With the transmitter and receiver in one of the two test modes, go around the conference hall and test the reception quality at every position where the infra-red signals must be received. When an area is detected where there is bad reception or even no reception at all, three main causes must be considered:

3.6.4 Bad coverage

The receiver cannot pick-up infra-red radiation of adequate strength. This can be because the tested position is outside the footprint of the installed radiators or the radiation is blocked by obstacles such as a column, an overhanging balcony or other large objects.

Check that you used the correct footprints for the system design, that radiators with enough output power are installed and that a radiator is not accidentally switched to half power operation. When the bad reception is caused by a blocked radiation path, try to remove the blocking obstacle or add an extra radiator to cover the shaded area.

3.6.5 Black spots

The receiver picks-up IR signals from two radiators which cancel out each other. The multipath effect can be identified by the observation that the bad reception only occurs along a specific line and/or when good reception returns when the receiver is rotated to another direction.

This can be confirmed by keeping the receiver in the position and direction with the bad reception and then either shading-off the radiation from one

radiator with your hand or switching off one radiator. If this improves the reception quality, then the multipath effect is causing the problem. Note that IR radiation that is reflected from a surface with a high reflectabiliy can also cause multipath problems.

Black spots can occur in case a transmitter is located in the same room as the radiators. In that case, disable the mini IR radiator of the transmitter with the configuration menu (see section 2.5.16).

Check that the signal delay compensation switches on the radiators are set to the correct value and that a switch is not accidentally positioned between two numbers. Re-check your system design. When necessary, reduce the distance between the two radiators that cause the problem and/or add an extra radiator. Note that due to the physical characteristics of the signal distribution, it is not always possible to completely avoid multi path effects.

3.6.6 Interference from IR systems

IR assistive hearing systems and IR microphones operating at frequencies above 2 MHz can disturb the reception at the lowest carriers. If such is the case, disable the lowest two carriers (see section 4.5.11) and re-check the reception.

4 DT 6008 & DT 6032 Transmitters

4.1 Description

The transmitter is the central element of the DCS 6000 Digital IR system. It accepts asymmetrical audio sources from a maximum of 32 external channels (dependent on the transmitter type) and can be used with the DCS 6000 Digital Conference System. It can also be used with analogue discussion and interpretation systems (e.g. CIE 9000), or as a stand-alone system distributing external audio sources.

The transmitter is suitable for either table-top or 19-inch rack-mounted use. Four feet (for table top use) and two mounting brackets (for rack mounting) are supplied.

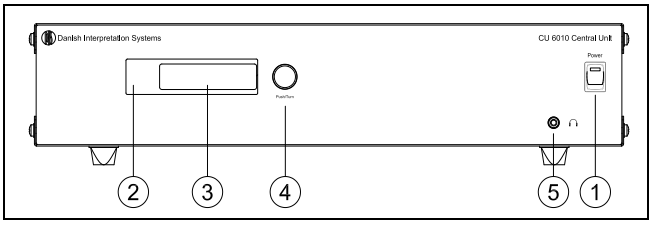


Figure 4.1-A Front view of DT 6008 and DT 6032 Transmitter

1. **Mains on/off switch** – After switching the mains on, the transmitter starts up and the display (3) will light-up.
2. **Mini IR-radiator** – Four IREDs, transmitting the same infra-red signal as the radiator output. This can be used for monitoring purposes. They can be disabled via the configuration menu.
3. **Menu display** – A 2x16 character LCD-display gives information about the transmitter status. It is also used as a an interactive display for configuring the system.
4. **Menu button** – A turn-and-push button to operate the configuration software in combination with the display (3).
5. **Monitoring headphone output** – A 3.5 mm (0.14 inch) jack socket to connect a headphone for monitoring purposes. It can be disabled via the configuration menu.

Note: The mini IR-radiator and the headphone output can also be permanently disabled by removing two resistors

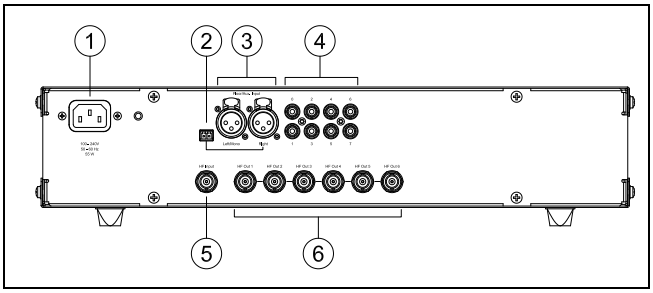


Figure 4.1-B Back view of DT 6008 Transmitter

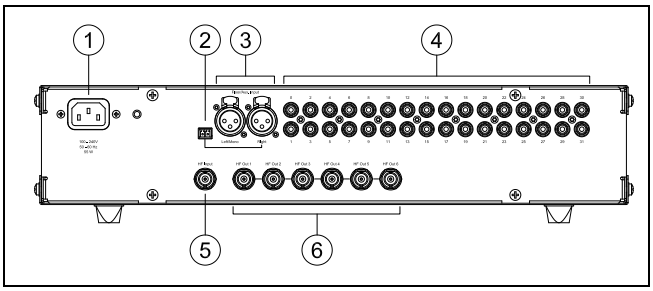


Figure 4.1-C Back view of DT 6032 Transmitter

1. **Mains input** – Euro mains socket. The transmitter has automatic mains voltage selection. A mains cable is provided.
2. **Emergency switch connector** – A terminal block socket for a single, 'normally open' switch. When the switch is closed, the audio signal on the Aux right input is distributed on all output channels, overriding all other audio inputs.
3. **Auxiliary audio inputs** – Two female XLR connectors for extra audio inputs. They can be used to connect auxiliary symmetrical audio signals such as a music installation, the floor language or emergency messages.
4. **Audio signal inputs** – 8 or 32 cinch plugs to connect external asymmetrical audio

input signals. The number of connectors depends on the transmitter type.

5. **Radiator signal loop-through input** – A HF BNC connector to loop-through the radiator output of another transmitter.
6. **Radiator signal outputs** – Six HF BNC connectors, used to connect the radiators. Up to 30 radiators can be loop-through connected to each output.

4.2 Installation

The transmitter can be placed on a table or installed in a standard 19" rack.

When installing in a 19" rack the supplied 19" brackets shall be fixed to the front side of the transmitter by unscrewing the crews holding the top and button cover and then fix the brackets using the same screws.

4.3 Connections

This chapter gives an overview of typical system connections using the DT 60xx range transmitter:

- Connecting the DCS 6000 Conference System
- Connecting other external audio sources
- Connecting an emergency signal switch
- Connecting another transmitter

4.3.1 Connecting the DCS 6000 Conference System

The transmitter is connected to DCS 6000 Conference System to an AO 6008 Audio Output Unit. Each AO 6080 can feed up to 8 'Audio Signal Inputs' in the transmitter.

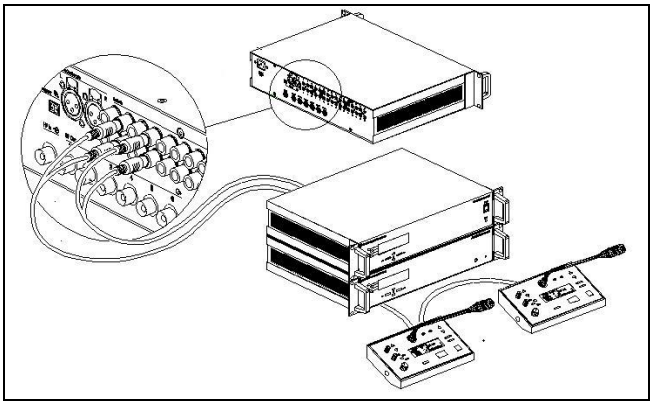


Figure 4.3-A Connecting the DCS 6000 Conference System.

Please refer to the 'AO 6008 User Manual' for more information.

4.3.2 Connecting other external audio sources

The transmitter has up to 32 audio inputs (depending on the transmitter type) to interface with external asymmetrical audio sources, such as congress systems from other manufacturers or for music distribution.

The audio signals (stereo or mono) are connected to the audio input cinch connectors.

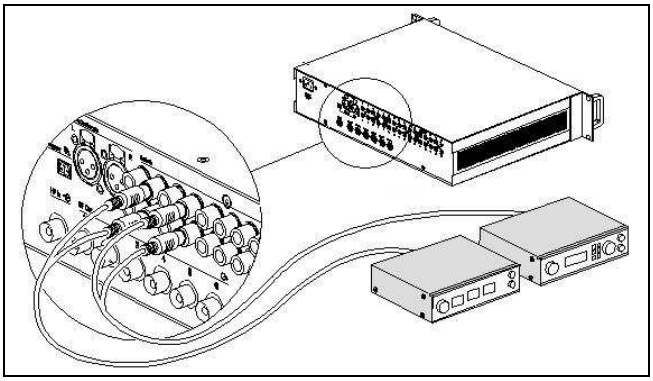


Figure 4.3-B Connecting external audio sources to the transmitter

4.3.3 Connecting an emergency signal

To use the emergency signal function, a switch (normally-open) must be connected to the emergency switch connector. The reaction of the

transmitter on a closed switch depends on the configuration of the auxiliary inputs (see also section 0):

- If the auxiliary input is 'Mono + Emergency', the audio signal on the Aux-Right input is distributed to all output channels, overriding all other audio inputs.
- If the auxiliary input is 'Stereo' or 'Stereo to Mono', the audio signals on the Aux-Left and Aux-Right inputs are distributed to all output channels, overriding all other audio inputs.

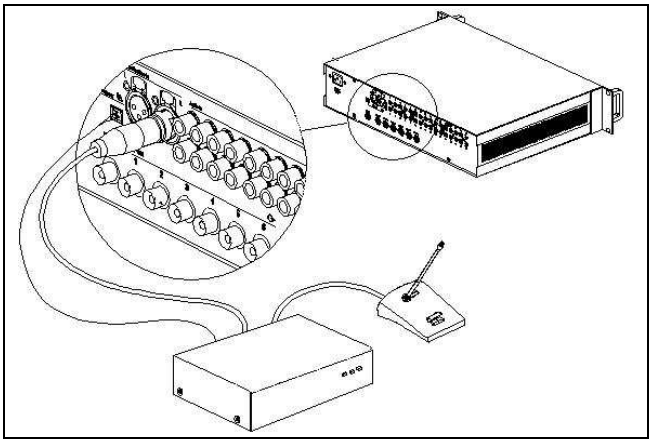


Figure 4.3-C Connecting an emergency signal

4.3.4 Connecting to another transmitter

The transmitter can be operated in slave mode to loop through the IR radiator signals from a master transmitter.

One of the six radiator outputs of the master transmitter is connected with an RG59 cable to the radiator signal loop-through input of the slave transmitter.

The Transmission mode of the slave transmitter must be set to ‘Slave’ (see section 4.5.7).

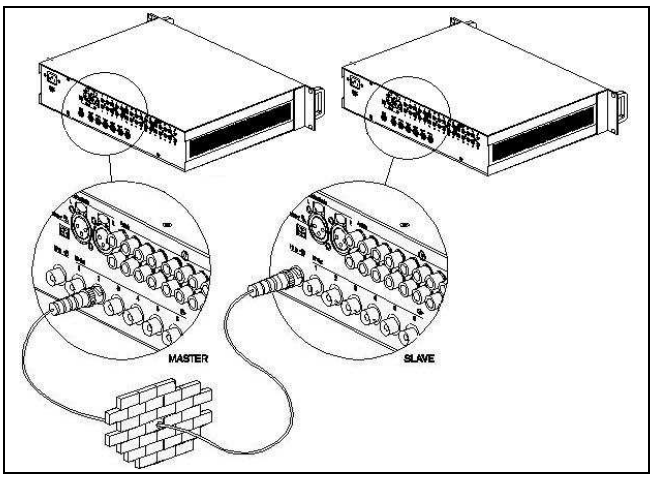


Figure 4.3-D Connecting another transmitter

4.4 Using the configuration menu

4.4.1 Overview

All configuration and operation options of the transmitter are set via an interactive menu, using a 2x16 character LCD display and a 'turn-and-push' menu button.

Figure 4.4-A gives an overview of the menu structure. A general description of how to use the menu is given in section 4.4.2. Some examples are given in section 4.4.3. The detailed descriptions of all menu items can be found in section 4.5.

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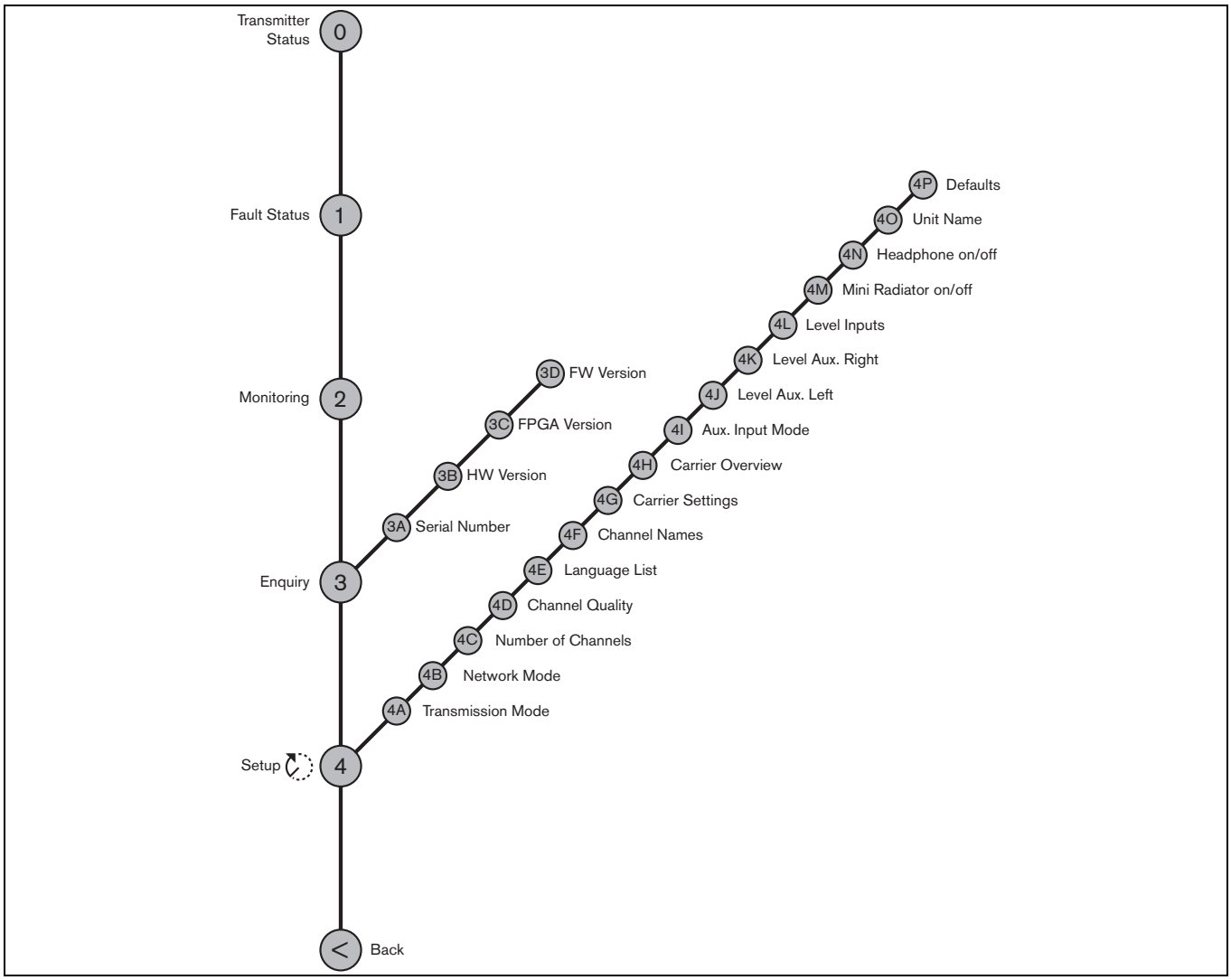


Figure 4.4-A Menu overview

4.4.2 Navigate through the menu

Operating the menu is always a sequence of alternating turns and pushes:

Turn the button to:

- Cycle through the menu items within a menu (the menu item number and title on the first line is blinking).
- Go to a settable option within a menu item (a blinking cursor moves through the menu screen).
- Cycle through the available values for a settable option (the value is blinking).

Push the button to:

- Confirm a chosen menu item (the menu item number and title stops blinking, a blinking cursor appears).
- Go to a sub-menu (the sub-menu item character starts blinking).
- Confirm the selection of a settable option (the cursor disappears, the option value starts blinking).
- Confirm a selected value for a settable option (the value stops blinking, the cursor appears again).

After 3 minutes of inactivity, the display automatically switches back to the first item of the Main menu (Transmitter Status).

Each menu item is identified by a number (for the Main menu) or by a number plus a character (for the sub-menus). The item identification can be found at the start of the first line and is used to navigate to and from sub-menus.

Most menu items have one or more settable configuration options. The value of an option can be changed by selecting a value from a list of available values.

To navigate through the Main menu:

Turn the button to move through the Main menu items. The item number and title starts blinking. (The first item, Transmitter Status, doesn't blink.)

To jump to a sub-menu:

1. Navigate in the Main menu to an item with three dots (e.g. 'Setup ...').
2. Push the button to go to the sub menu. The submenu item character and title starts blinking.

Note: To enter the Setup sub-menu, push and hold the button for at least 3 seconds.

To navigate through a sub-menu:

1. Turn the button to move the cursor to the submenu item character.
2. Push the button. The item character and title starts blinking.
3. Turn to select another sub-menu item character.
4. Push to confirm the selection.

To change option values:

1. Navigate to the applicable menu item.
2. Turn the button to move the cursor to the option value you want to change.
3. Push the button to activate the option. The option value starts to blink.
4. Turn the button to select a new option value.
5. Push the button to confirm the new value. The option value stops blinking.
6. Turn the button to move the cursor to another settable option (when available) and repeat steps 3 to 5.

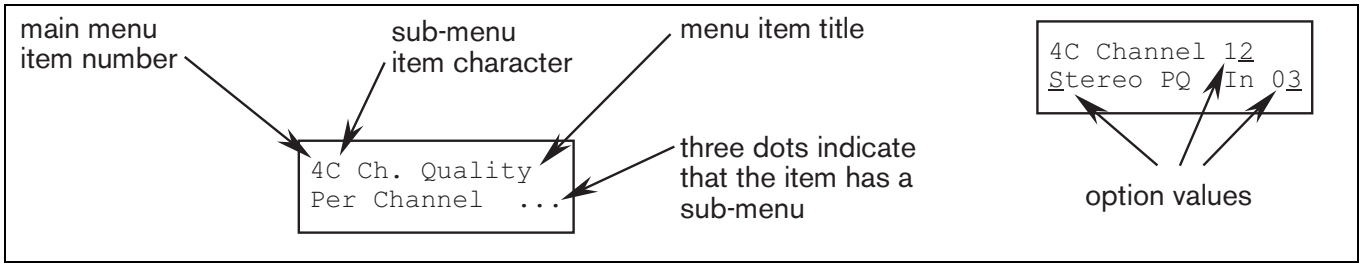


Figure 4.4-B Menu item screen elements

To jump back from a sub-menu to an item of the Main menu:

1. Turn the button to move the cursor to the Main menu item number.
2. Push the button. The item number and title starts blinking.
3. Turn to select another item number.
4. Push to confirm the selection.

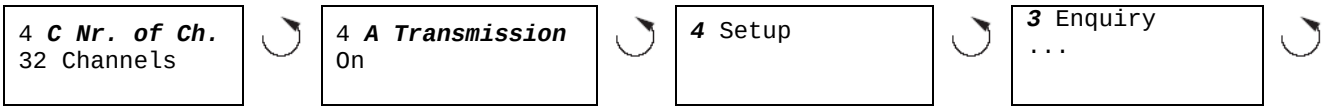
When you are turning counter-clockwise through submenu items, the display jumps automatically to the Main menu after you have reached the first item (A) of the sub-menu. Example:

To jump back from an item of the Main menu to the Transmitter Status:

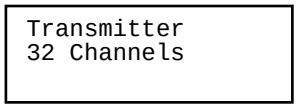
1. Turn the button to the < Back screen.
2. Push the button to go to the Transmitter Status.

4.4.3 Examples

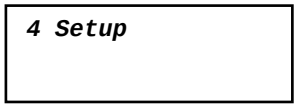
Each step in the examples below shows the text on the display and the action to go to the next step. Bold text in italics (text) indicates that the text is blinking. An underscore (_) indicates the position of the cursor. Each example starts at the Transmitter Status screen.



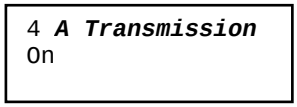
4.4.3.1 Example 1: Disable carrier 2. (See also section 4.5.11).



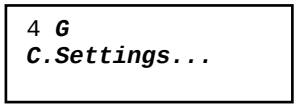
1 Turn the button to select the 'Setup' item (4) in the Main menu.



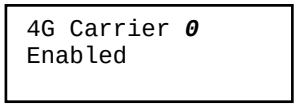
2 Push and hold the button for 3 sec. to go to the 'Setup' submenu.



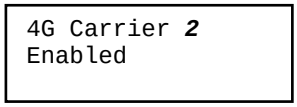
3 Turn to select the 'C.Settings' sub-menu item (4G).



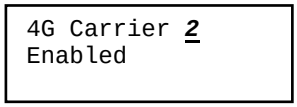
4 Push to go to the 'C.Settings' sub-menu.



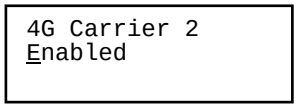
5 Turn to select carrier 2.



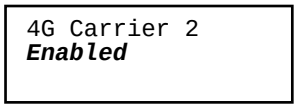
6 Push to confirm.



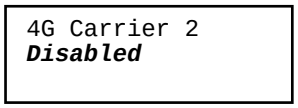
7 Turn to move the cursor to the second line.



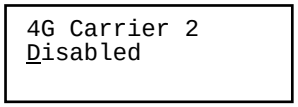
8 Push to confirm.



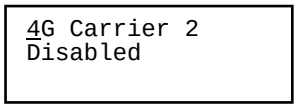
9 Turn to select 'Disabled'.



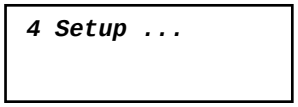
10 Push to confirm



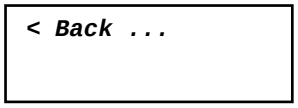
11 Turn to move the cursor to the Main menu item number (4).



12 Push to confirm.



13 Turn to select the < Back screen



14 Push to confirm

15 Ready

4.4.3.2 Example 2: Assign a user defined name to ch. 12. (See also section 0.)

Transmitter 32 Channels	1 Turn the button to select the 'Setup' item (4) in the Main menu.
4 Setup	2 Push and hold the button for 3 sec. to go to the 'Setup' submenu.
4 ***A Transmission*** On	3 Turn to select the 'C.Settings' sub-menu item (4G).
4***F Ch.Names ...*** Floor	4 Push to go to the 'Ch. Names' sub-menu.
4F Channel ***00*** Spanish	5 Turn to select the required channel number (12).
4F Channel ***12*** Spanish	6 Push to confirm.
4F Channel 1<u>2</u> Spanish	7 Turn to move the cursor to the start of the second line.
4G Carrier 12 <u>S</u>panish	8 Push to confirm.
4F Channel 12 ***Spanish***	9 Turn clockwise until channel name changes to: • - - -
4F Channel 12 • - - -	10 Push to confirm.
4F Channel 12 <u>•</u> - - -	11 Turn to move the cursor to the first dash.
4F Channel 12 • <u>-</u> - -	12 Push to confirm.
4F Channel 12 • - - -	13 Turn to select the first character (C).
4F Channel 12 • ***C***--	14 Push to confirm this character.
4F Channel 12 • <u>C</u>--	15 Repeat steps 11 to 14 for the other characters.
4F Channel 12 • CD Music	16 Turn to move the cursor to the Main menu item number (4).
<u>4</u>F Channel 12 • CD Music	17 Push to confirm.
4 Setup ...	18 Turn to select the < Back screen
< Back ...	19 Push to confirm
Transmitter 32 Channels	20 Ready

4.4.3.3 Example 3: Set channel 11 to transmit a Stereo signal in Premium Quality, using audio inputs 14 (L) and 15 (R) as source. (See also section 4.5.9.)

Transmitter 32 Channels	1 Turn the button to select the 'Setup' item (4) in the Main menu.
4 Setup	2 Push and hold the button for 3 sec. to go to the 'Setup' submenu.
4 ***A Transmission*** On	3 Turn to select the Channel Quality' sub-menu item (4D).
4***D Ch. Quality*** All Mono SQ	4 Push to confirm.
4D Ch. Quality All Mono SQ	5 Turn to move the cursor to the option on the second line.
4D Ch. Quality All Mono SQ	6 Push to confirm.
4D Ch. Quality ***All Mono SQ***	7 Turn to select the option value 'Per Channel ...'.
4D Ch. Quality ***Per Channel ...***	8 Push to go to the 'Channel' sub-menu (4C).
4D Channel ***00*** Mono SQ In 00	9 Turn to select the required channel number (11).
4D Channel ***11*** Mono SQ In 00	10 Push to confirm.
4D Channel 11 Mono SQ In 10	11 Turn to move the cursor to the quality option.
4D Channel 11 Mono SQ In 10	12 Push to confirm.
4D Channel 11 ***Mono SQ*** In 10	13 Turn to select the required quality value (Stereo PQ).
4D Channel 11 ***Stereo PQ*** In 10	14 Push to confirm. *
4D Channel 11 Stereo PQ In 12	15 Turn to move the cursor to the input number.
4D Channel 11 Stereo PQ In 12	16 Push to confirm.
4D Channel 11 Stereo PQ In ***12***	17 Turn to select the required input number (14).
4D Channel 11 Stereo PQ In ***14***	18 Push to confirm.
4D Channel 11 Stereo PQ In 14	19 Turn to move the cursor to the Main menu item number (4).
4D Channel 11 Stereo PQ In 14	20 Push to confirm.
4 Setup ...	21 Turn to select the < back screen
< Back ...	22 Push to confirm
Transmitter 32 Channels	23 Ready

* Note that after selecting 'Stereo' as input mode (step 14) the input number changes automatically to the next even number (12), which is the input number of the left signal.

4.5 Configuration and operation

The next sections give descriptions of the possible configuration options. Each description is followed by the relevant menu items with detailed information per menu option.

The default values (see section 'Reset all options to factory defaults') are indicated by an asterisk (*) when applicable.

4.5.1 Start-up

When the transmitter is switched on, the display shows the Transmitter Status screen, which is the first item of the Main menu.

The display also goes to this screen after 3 minutes of inactivity. In case the system detects a fault, the display shows a flashing fault message (see section 4.5.4).

4.5.2 Main menu

The main menu contains the screens to view the transmitter status and the radiator fault status. It also contains the entry points to the Monitoring, Enquiry and Setup sub-menus.

Menu Item	Item Description
Transmitter Status	Shows the transmitter status (see section 4.5.3)
1 Fault Status	Shows the radiator fault status (see section 4.5.4)
2 Monitoring . . .	Go to the 'Monitoring' sub-menu (see section 4.5.5)
3 Enquiry . . .	Go to the 'Enquiry' sub-menu (see section 0)
4 Setup . . .	Go to the 'Setup' sub-menu (see sections 4.5.7 and higher) **Note:** To enter the Setup sub-menu, push and hold the button for at least 3 seconds

4.5.3 View transmitter status

The first screen of the Main menu gives information about the present status of the transmitter. The screen shows the name of the transmitter (1st line) and the present transmission mode (2nd line). (See section 4.5.7 to change the transmission mode).

Transmitter Status

```
DT 6008
10 Channels
```

Options	Description
Name	The first line shows the name of the transmitter (see section 4.5.17 for changing).
Modes	The second line shows the actual transmission mode:
nn channels	Audio signals are distributed on nn channels.
Aux to All	The signal on the Aux. inputs is distributed on all channels.
nn Ch. Test	The test signals are distributed on nn channels.
Slave	The transmitter operates in slave-mode: the radiator signal on the slave input is looped-through to all radiator outputs
Standby	The transmitter is in stand by mode (not transmitting).
Emergency Call	An emergency signal from the Aux. inputs is distributed to all channels.

4.5.4 View fault status

The fault status of the radiators can be seen in the second screen of the Main menu:

1 Fault Status	
1 Fault Status No Faults	
Options	**Description**
No Faults	The connected radiators function without problems.
Radiator Fault	One of the connected radiators is not functioning properly.
No Radiators	No radiators are connected to the transmitter.

.

When the system detects a failure for the first time, a flashing fault message pops-up on any menu screen:

```
Radiator Fault
```

or

```
No Radiators
```

or

```
No Network
```

or

```
Network Error
```

Push the menu button to remove the fault message from the screen and to go back to the menu screen that was visible before the fault message popped-up. The flashing message will also disappear when the fault has been resolved.

4.5.5 Set monitoring options

The Monitoring sub-menu (2) is used to set which signal is sent to the monitoring headphone output. It can be one of the inputs, one of the channels or no signal.

When the sensitivity of one of the inputs is being changed in the Setup menu (4I, 4J or 4K), or when assigning inputs to channels (menu 4C, Per Channel), the monitoring output automatically switches temporarily to that source, even when the option 'None' has been chosen.

2 Monitoring

```
2 Monitoring
In. 04   -9 dB
```

Options	Description
In. nn dd dB	The signal from audio input "nn" is available on the monitoring headphone output Input nr. "nn": {00 ... 31} Volume: "dd" dB {-31 ... 0}
Ch. nn dd dB	The signal on channel "nn" is available on the monitoring headphone output. Channel nr. "nn": {00 ... 31} Volume: "dd" dB {-31 ... 0}
Aux.L dd dB	The signal on the Aux. Left input is available on the monitoring headphone output. Volume: "dd" dB {-31 ... 0}
AuxR dd dB	The signal on the Aux. Right input is available on the monitoring headphone output. Volume: "dd" dB {-31 ... 0}
None dd dB	The monitoring headphone output is switched off during normal operation, but is active when the sensitivity of one of the inputs is being changed. Volume: "dd" dB {-31 ... 0}

When the headphone output is disabled (see section 4.5.16), the output level can not be changed and the level indicator is not visible.

The 'Source/volume' screen also displays level meters (two for a stereo source, one for a mono source) for a visual indication of the actual signal strength:

■ = low level

▮ = high level

▲ = overflow.

4.5.6 View version information

In the Enquiry sub-menu (3), version information of the transmitter can be found. This information should be mentioned in service requests or failure reports.

3 Enquiry

```
3A Serial Number
FC.0.0012D
```

Options	Description
3A Serial Number	Shows the serial number of the transmitter board.
3B HW Version	Shows the version number of the transmitter board.
3C FPGA Version	Shows the version number of the FPGA software of the transmitter board.
3D FW Version	Shows the version number of the transmitter firmware.

4.5.7 Set transmission mode

The Transmission Mode menu item (4A) is used to select which signals will be distributed over the channels. It is also possible to switch all channels off (Standby).

4 Setup/4A Transmission

```
4A Transmission
ON
```

Options	Description
Standby	All channels are switched off, no signals are distributed.
On	Normal transmission. Input signals are distributed on the channels as set in the Channel Quality sub-menu (4D).
Aux to All	The signals on the Auxiliary inputs are distributed on one carrier to all channels.
Test	A different test tone is distributed on each channel. The frequency increases with increasing channel number. For stereo channels the tone for left and right will also be different.
Slave	The radiator signal on the slave input is looped-through to all radiators.

4.5.8 Set number of channels

Via sub-menu item 4B the number of channels that will be used can be set.

Note that the maximum number of channels depends on the transmitter type (8 or 32 channels) and the chosen quality modes.

4 Setup/4B Nr. of Ch.

```
4A Nr. of Ch.
Manual:  08
```

Options	Description
Automatic: nn	The number of used channels is set automatically to the maximum possible number of channels depending on transmitter type and the selected quality modes). Channels “nn”: {1 ... 32}
Manual: nn	Set the number of used channels (the maximum number depends on the transmitter type and the selected quality modes). Channels “nn”: {1 ... 32}

An asterisk (*) is shown when the selected number is not possible because it is higher than the maximum number of channels.

4.5.9 Set channel quality and assign inputs to channels

The audio quality of the channels (mono/stereo, standard/premium) can be set in sub-menu 4D. The quality can be set the same for all channels or for each channel separately. Note that choosing stereo and/or premium quality uses more bandwidth and decreases the number of available channels (see section 3.2.4). In stereo mode, the left signal is always an even numbered input. The next higher input number is used for the right signal. When the quality is set the same for all channels with the 'All Mono' or 'All Stereo' options, the inputs are assigned automatically to the channels as indicated in the table below:

All Mono		All Stereo		
Channel	Input	Channel	Input L	Input R
00	00	00	00	01
01	01	01	02	03
...	...	...	...	...
31	31	15	30	31

With menu option 4C (Per Channel Settings), the assignment can also be done for each channel separately.

4 Setup/4C Ch. Quality

```
4C Ch. Quality
All Mono SQ
```

Options	Description
All Mono SQ	Set all channels to mono, standard quality.
All Mono PQ	Set all channels to mono, premium quality.
All Stereo SQ	Set all channels to stereo, standard quality.
All Stereo PQ	Set all channels to stereo, premium quality.
Per Channel . . .	Select this option to go to the 'Per Channel Settings' menu.

4.5.9.1 Per Channel Settings

4 Setup/4C Ch. Quality

```
4C Channel 01
Mono SQ  In 01
```

Options	Description
4C Channel nn	Select which channel to configure. Channel nr. "nn": {00 ... 31}
Disabled In nn	Disable selected channel. Input nr. "nn": {00 ... 31}
Mono SQ In nn	Set selected channel to mono, standard quality. Input nr. "nn": {00 ... 31} Select the audio input that should be distributed on the selected channel.
Mono PQ In nn	Set selected channel to mono, premium quality. Input nr. "nn": {00 ... 31} Select the audio input that should be distributed on the selected channel.
Stereo SQ In nn	Set selected channel to stereo, standard quality. Input nr. "nn": {00 ... 31} Select the audio input that should be distributed on the selected channel. For stereo signals, the input number of the left signal (even number) should be selected.
Stereo PQ In nn	Set selected channel to stereo, premium quality. Input nr. "nn": {00 ... 31} Select the audio input that should be distributed on the selected channel. For stereo signals, the input number of the left signal (even number) should

	be selected.

Note An asterisk (*) is shown behind the channel number when the channel in the configured quality does not fit on the available carriers (see section 3.2.4).

4.5.10 Set channel names

Each channel can be assigned a name via the Channel Names menu (4E). This can be 'Floor' or one of 30 pre-defined ISO language names. Also up to 32 user-defined names can be added.

The language in which the pre-defined names are presented can be chosen via the Language List menu option (4D).

4 Setup/4D Language List

```
4D Language List
English
```

Options	Description
English	Present language list in English.
French	Present language list in French.
Original	Present each language name in it's original language (e.g. English, Français, Deutsch, etc.).

4 Setup/4E Ch. Names

```
4E Channel 01
English
```

Options	Description
4E Channel nn	Select which channel to name. Channel nr. "nn": {00 ... 31}
'Floor'	Use this name for the channel that carries the 'Floor' language.
ISO language names	Choose from pre-programmed ISO language names.
User defined	Up to 32 userdefined names (max. 12 characters) can be added and chosen.

4.5.11 Disable or enable carriers

Normally the channels are automatically assigned to the available carriers. However, when the reception quality of a specific carrier is not good, that carrier can be disabled manually. The channels are then automatically re-assigned to the next available carriers.

Each of the 8 carriers (0 to 7) can be disabled or enabled in the Carrier Settings menu (4F).

4 Setup/4F C. Settings

```
4F Carrier 0
Enabled
```

Options	Description
4F Carrier n	Select which carrier to configure. Carrier nr. "n": {0 ... 8}
Disabled	The selected carrier is disabled (off).
Enabled	The selected carrier is enabled (on).

4.5.12 View carrier assignments

With menu option 4H the carrier assignment can be seen, i.e. which channels are transmitted on each carrier.

Note that the number of channels that can be distributed on one carrier depends on the chosen quality mode.

4 Setup/4G C. Overview

```
4G Carrier 0
Ch. 00 01 02 03
```

Options	Description
4H Carrier n	Select which carrier to view. Carrier nr. "n": {0 ... 8}
Ch nn nn nn nn	Shows the channel numbers that are assigned to the selected carrier. The symbol '- -' is used when less than 4 channels are assigned. Channel nr. "nn": {00 ... 31} If the channel number is represented one time Mono SQ is assigned to this carrier. If the channel number is represented two times Mono PQ or Stereo SQ is assigned to this carrier. If the channel number is represented four times Stereo PQ is assigned to this carrier.

4.5.13 Configure auxiliary inputs

The way the signals on the auxiliary inputs (Aux-.L and Aux.-R) are handled can be set in the Aux. Input Mode menu (4H).

When the option 'Stereo' is chosen, the signals on both Aux. inputs are distributed as a stereo signal to all channels. This setting can for instance be used to transmit a music signal during breaks in a conference.

Note that the Transmission mode must be set to 'Aux to All' (menu item 4A) to actually transmit this stereo signal.

The 'Stereo to Mono' and 'Mono+ Emergency' options can be selected when the transmitter is used in combination with an interpretation system.

The Aux. input(s) will be distributed to the Symmetrical Audio Input.

4 Setup/4H Aux. Input

```
4H Aux. Input
Stereo
```

Options	Description
Stereo	The Aux. inputs will be distributed in stereo to all channels when the transmission mode (menu item 1) is set to 'Aux to All'.
Stereo to Mono	The Aux-L and Aux-R inputs are combined into a mono signal and distributed to the Symmetrical Audio Input.
Mono + Emergency	The Aux-L input is distributed to the Symmetrical Audio Input and Interpreters Module (when present). The Aux-R input is distributed as emergency signal to all channels when the emergency switch is closed.

4.5.14 Set sensitivity of the inputs

The sensitivity of the audio and Aux. inputs can be set in the Input Sensitivity menus (4I, 4J, 4K).

The sensitivity can be set the same for all audio inputs (menu item 4K) or for each audio input separately.

4 Setup/4I Level Aux. L

```
4I Level Aux.L
0 dB
```

Options	Description
xx db	Set the required sensitivity for the left auxiliary input. Level “xx” dB: {-6 ... +6}

4 Setup/4J Level Aux. R

```
4J Level Aux.R
0 dB
```

Options	Description
xx db	Set the required sensitivity for the right auxiliary input. Level “xx” dB: {-6 ... +6}

4 Setup/4K Level Inputs

```
4K Level Inputs
All   -6 dB
```

Options	Description
All xxdB	Set the sensitivity of all audio inputs to a user defined level. Level “xx” dB: {-6 ... +6}
Per Input ...	Select this option to go to the ‘Per Input Sensitivity Settings’ menu.

4.5.14.1 Per Input Sensitivity settings

4 Setup/4K Level Inputs

```
4K Sens. Input 00
  0 dB
```

Options	Description
4K Sens.Input nn	Select which input to set. Input nr. “nn”: {00 ... 31}
xx db...	Select the required sensitivity. Level “xx” dB: {-6 ... +6}

The sensitivity screens also display a level meter for a visual indication of the actual signal strength:

- ■ = low level
- ▮ = high level
- ▲ = overflow.

4.5.15 Enable / disable IR-monitoring

The mini IR-radiator at the front of the transmitter can be used for monitoring the IR-signal.

When required (e.g. for security reasons) this option can be switched off (menu 4L).

4 Setup/4L Mini Radiator

```
4L Mini Radiator
Enabled
```

Options	Description
Enabled Disabled	Enable or disable the mini IR-radiator at the front of the transmitter.

4.5.16 Enable / disable headphone output

The headphone output at the front of the transmitter can be used for monitoring the input-and channel signals.

When required (e.g. for security reasons) this option can be switched off in menu item 4M.

4 Setup/4M Headphone

```
4m Headphone
Enabled
```

Options	Description
Enabled Disabled	Enable or disable the headphone output at the front of the transmitter.

4.5.17 Choose transmitter name

The transmitter can be assigned a user-defined name. This name is used in the Transmitter Status screen. The name can be edited in the Unit Name menu (4N).

4 Setup/4N Unit Name

```
4M Headphone
DT 6008
```

Options	Description
Free Text	Assign a user defined name to the transmitter (max. 16 characters). The default name is ‘DT 6008’ or ‘DT 6032’ depending of the model.

4.5.18 Reset all options to factory default values

Use menu item 4O to reset all options to the factory defaults. The user defined transmitters name, the user defined language names and the transmission mode are not reset. (The default values are indicated by an asterisk (*) in the menu descriptions.)

4 Setup/4O Defaults

```
4O Reset to
defaults? No
```

Options	Description
No	Cancel Reset.
Yes	Reset all options to the factory default value. The user defined transmitters name, the user defined language names and the transmission mode are not reset.

5 Digital Radiators

5.1 Medium and High Power Radiators

5.1.1 Description

These units accept the carrier signals generated by the transmitter and emit infra-red radiation carrying up to 32 audio distribution channels. They are connected to one or more of the six HF BNC outputs of the IR transmitter.

A maximum of 30 radiators can be connected to each of these outputs by means of loop through connections. The RA 6013 has an infra-red output of 16 Wpp, while the RA 6025 has an infra-red output of 32 Wpp. Both have an automatic mains power voltage selection and are switched on automatically when the transmitter is switched on. The attenuation of the signal by the cable is equalised automatically by the radiator.

When the radiator is supplied with power and the transmitter is switched on, the radiator initialises the equalisation. The red LEDs flash for a brief period of time to indicate that the initialisation is in progress. When not receiving carrier waves, the radiators switch to standby mode.

There is also a temperature protection mode which automatically switches the radiators from full to half power or from half power to stand-by if the temperature of the IREDs becomes too high.

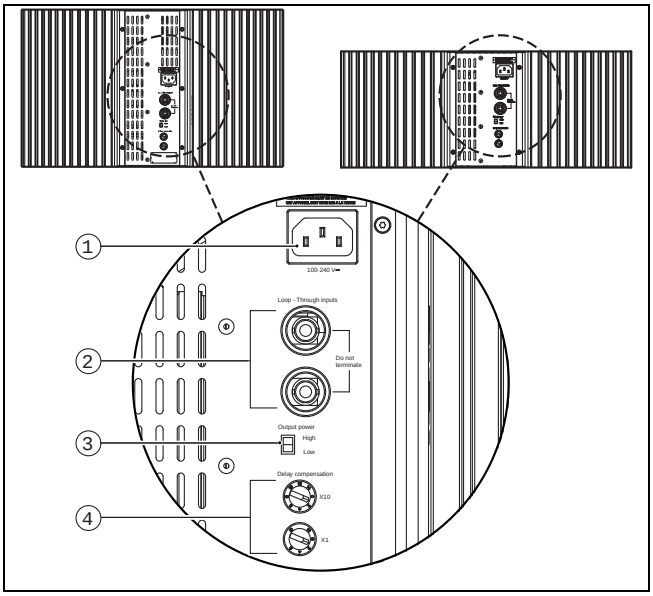


Figure 5.1-A RA 6013 and RA 6025 back view

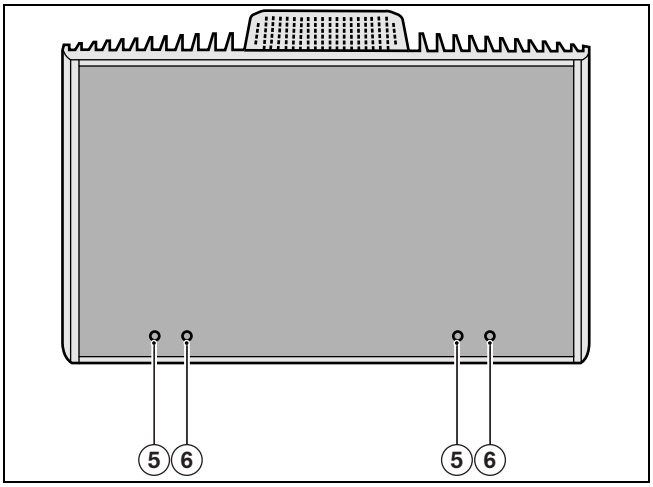


Figure 5.1-B RA 6013 and RA 6025 front view

1. **Mains input** - Male Euro mains connector. The radiators have automatic mains voltage selection.

2. **IR signal input/loop-through** - Two HF BNC connectors for connecting the radiator to the transmitter and for loop-through connection to other radiators. Automatic cable termination is achieved by a built-in switch in the BNC connectors.
3. **Output power selection switch** - The radiators can be switched between full- and half-power operation.
4. **Delay compensation switches** - Two 10-position switches to compensate for differences in cable lengths to the radiators.
5. **Amber indicator LEDs** - Give an indication of the radiator status.
6. **Red indicator LEDs** - Give an indication of the radiator status.

Note: The indicator LEDs are positioned behind the semi-transparent cover and are only visible when ON.

5.1.2 Radiator status indication

A radiator consists of two IRED panels. Each IRED panel has an amber and a red indicator LED (see figure Figure 5.1-B) which show the status of the radiator panel

Red LED	Amber LED	Status
on	off	Stand-by mode
off	on	Transmitting
flashing	on	At switch-on: *Initialising signal equalisation* During operation: *Temperature protection mode.* *See chapter 6, Trouble-shooting*
	on	If IRED panel failure: *See chapter 6, Trouble-shooting*

5.1.3 Mounting the radiators

Radiators in permanent installations can be either fixed to a wall, hung under a ceiling or balcony or secured to any sturdy material, using the suspension bracket supplied with the radiator. The mounting angle can be adjusted for optimal coverage.

For wall mounting a separate bracket is also required. In non-permanent installations, a floor stand can be used.

5.1.3.1 Attaching the suspension bracket

First assemble the supplied suspension bracket and connect it to the radiator (see Figure 5.1-C and Figure 5.1-D).

This bracket is attached to the radiator by two bolts with washers. There are corresponding holes on the back of the radiators. There is also a spring-loaded plunger (indicated by a black arrow in Figure 5.1-D), located above the bolt hole on the right-hand arm of the bracket, which is used for adjusting the angle of the radiator (shown in inset in Figure 5.1-D). There are corresponding holes on the back of the radiator for accepting this plunger. The mounting angle can be adjusted in steps of 15°.

Warning: Always ensure that natural airflow is not obstructed by ceilings, walls etc. when determining the position of the radiator. Leave plenty of space around the radiator to prevent it becoming too hot.

Note: When in operation, the radiators may feel warm to the touch. This is quite normal, and does not indicate a radiator fault or malfunction.

Warning: When you install the radiator in a ceiling, you must leave at least 1 m3 of free space around the back of the radiator. To prevent the radiator from becoming too hot, make sure that there is a good airflow in this free space.

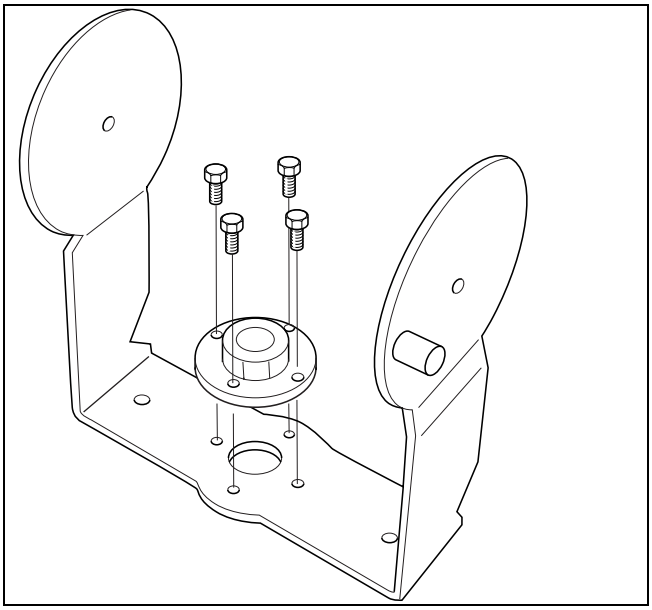


Figure 5.1-C Attaching the plate to the suspension bracket

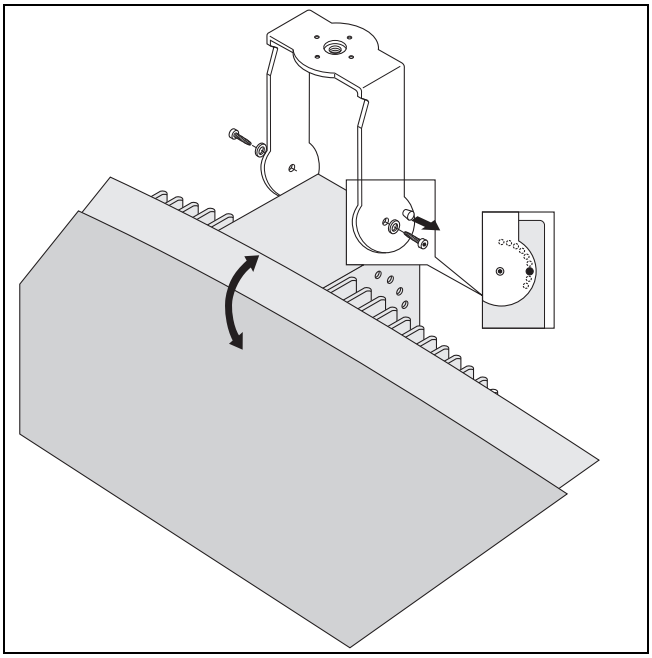


Figure 5.1-D Attaching the suspension bracket to the radiator

5.1.3.2 Mounting on a floor stand

The top of the floor stand is screwed into the suspension bracket (Figure 5.1-E). The bracket is supplied with both metric and Whitworth threaded plates, and is therefore compatible with most standard floor stands.

For floor stands, the mounting angle can be set at 0°, 15° or 30°.

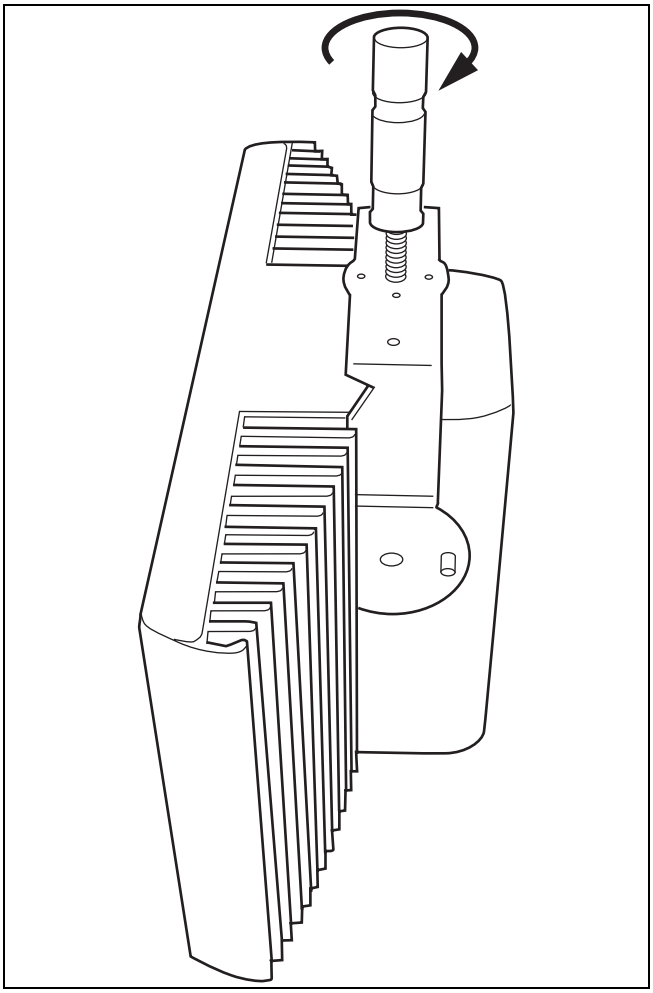


Figure 5.1-E Attaching the stud of a floor stand to the suspension bracket of the radiator

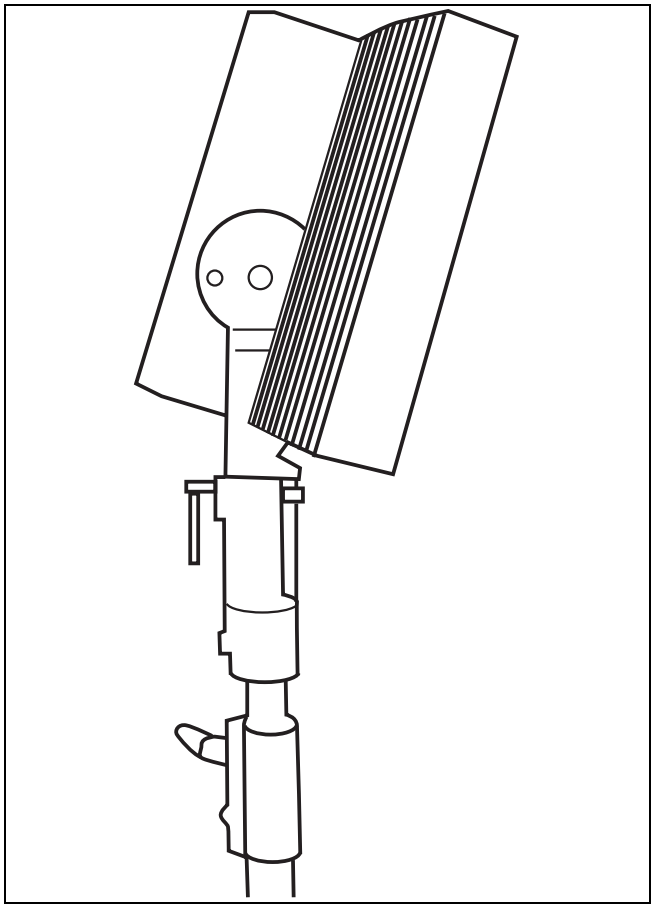


Figure 5.1-F Attaching the radiator inclusive suspension bracket and stud to the FS floor stand

5.1.3.3 Wall mounting

For wall mounting, the WB 6000 wall bracket is required (must be ordered separately).

This bracket is attached to the wall by means of four bolts (see Figure 5.1-H). Four holes of 10 mm in diameter and 60 mm in depth must be drilled using the drilling pattern (see Figure 5.1-G).

Note: The four bolts used to attach the bracket must each be able to withstand a pull-out force of 200 kg (440 lb).

The bolts and plugs delivered with the WB 6000 wall bracket are only intended for mounting the unit on a solid brick or concrete wall.

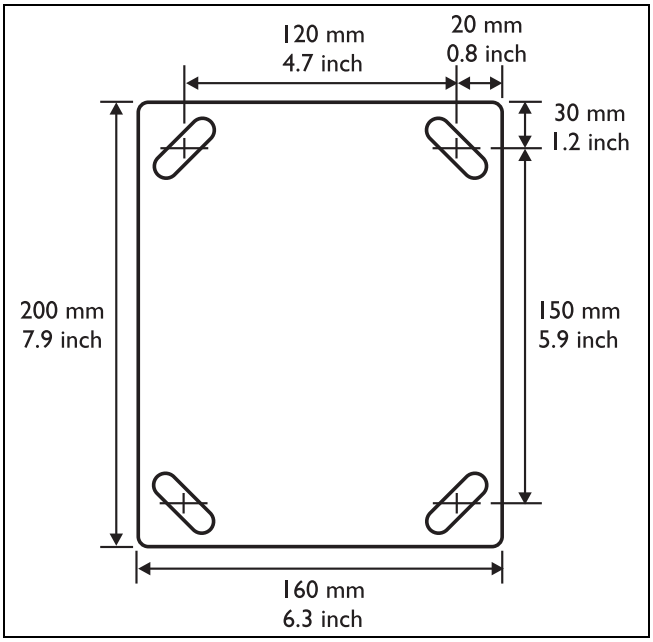


Figure 5.1-G WB 6000 wall mounting bracket showing dimensions and drilling pattern

The radiator (plus suspension bracket) is attached to the wall bracket by sliding the mounting bolt over the slot on the wall bracket and then tightening it (see Figure 5.1-I). A split pin is then inserted into a small hole in the bolt to stop it from working loose (see inset in Figure 5.1-I). The vertical angle of the radiator can be adjusted between 0 and 90° in steps of 15°. The horizontal orientation of the radiator can be adjusted by loosening the bolt then turning the radiator to the required position.

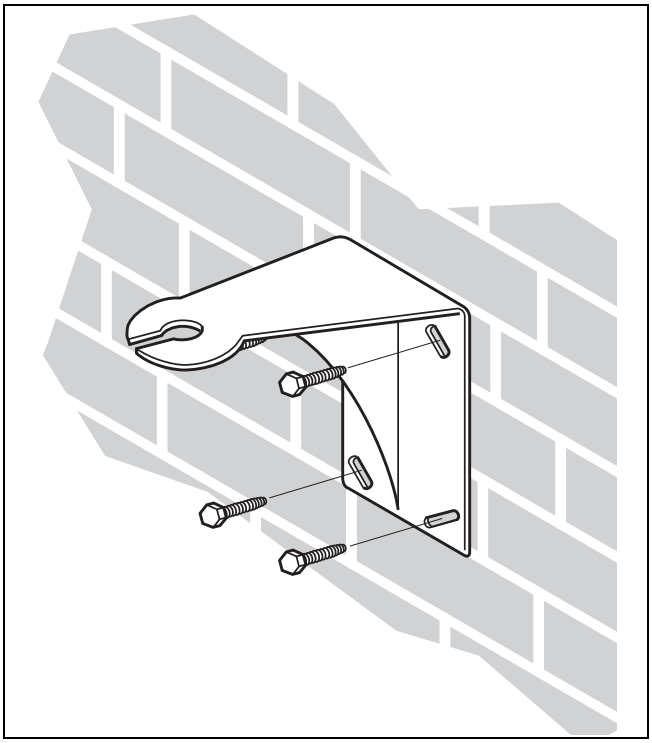


Figure 5.1-H Attaching the wall mounting bracket to a wall

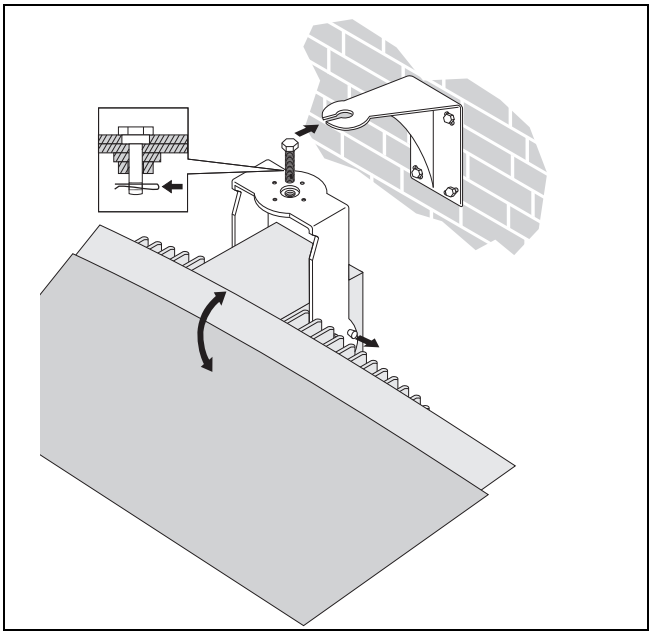


Figure 5.1-I Attaching the radiator to the wall mounting bracket

5.1.3.4 Ceiling mounting

The radiators can be attached to the ceiling using the supplied suspension bracket. This ensures enough space for a proper air flow around the radiator.

Mounting a radiator in the ceiling will in most cases require a forced air flow by means of a ventilator to prevent overheating.

5.1.3.5 Mounting on horizontal surfaces

When the radiator has to be positioned a horizontal surface (e.g. on top of an interpreter booth), the distance between the radiator and the surface must be at least 4 cm (1.5 inch) to enable enough air flow around the radiator.

This can be achieved by using the suspension bracket as a support. If this is not possible, switch the radiator to half power. If the radiator is used at full power on top of an interpreter booth, the ambient temperature must not exceed 35°C.

5.1.4 Connecting radiators to the transmitter

The transmitter has six BNC HF Output connectors labelled 1, 2, 3, 4, 5 and 6 on the rear panel. All six outputs are functionally identical. They can each drive up to 30 radiators (RA 6013 and/or RA 6025) in a loop-through configuration. The radiators are connected with RG59 cables. The maximum cable length per output is 900 m (2970 ft) to the last radiator.

Automatic cable termination is achieved by a built-in switch in the BNC connectors on the radiator.

Notes:

• For the automatic cable termination to work, never leave an open-ended cable connected to the last radiator in a loop-through chain.

• When connecting infra-red radiators, do not split the cable, else the system will not function correctly.

6 Digital Receivers

6.1 Description

The receivers are available for 4, 8 or 32 channels. They can operate with a rechargeable NiMH battery pack or with disposable batteries and have controls for channel selection, volume adjustment and an on/off push button. All receivers have a 3.5 mm (0.14 inch) stereo jack output socket for mono or stereo headphones.

An LCD display shows the channel number and indicators for signal reception and low battery power.

Charging circuitry is included in the receiver.

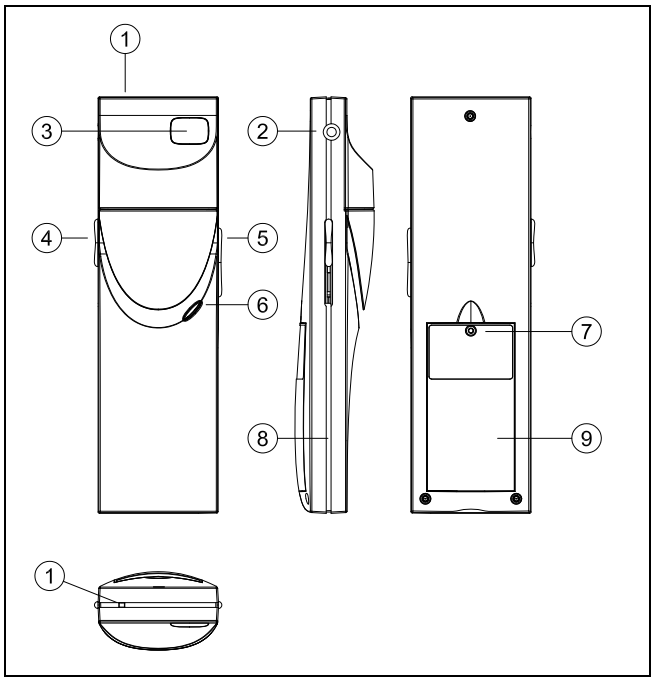


Figure 6.1-A Receiver, front view and back view

1. **Charging indicator LED** - Used in combination with the charging equipment.
2. **Headphone connector** - A 3.5 mm (0.14 inch) stereo jack output socket for the headphone, with integrated Stand-by/Off-switch.
3. **LCD Display** - A two digit display showing the selected channel. An antenna symbol is visible when the receiver picks up an infra red signal of adequate quality. A battery symbol is visible when the battery pack or the batteries are almost empty.
4. **Volume control** - A slider to adjust the volume.
5. **Channel selector** - An up/down switch to select an audio channel. The channel number is shown on the LCD display.
6. **On/Off button** - When a headphone is connected, the receiver switches to Stand-by state. Pressing the On/Off button switches the receiver from Stand-by to On. To switch back to Stand-by, press and hold the button for approx. 2 seconds. When the headphone is removed, the receiver switches automatically to the Off-state.
7. **Battery pack connector** - This connection is used to connect the battery pack to the receiver. Charging is automatically disabled when this connector is not used.
8. **Charging contacts** - Used in combination with the charging equipment to recharge the battery pack (if used).
9. **Battery pack or disposable batteries** - Either a rechargeable BP 6001 NiMH battery pack or two disposable AA-size 1.5 V batteries.

Note: When the receiver is not used, disconnect the headphones. This ensures that the receiver is totally switched-of and no energy is consumed from the batteries or the battery pack.

6.2 Operation

The receiver cannot operate when no headphone is connected. After connecting the headphone the receiver switches to stand-by mode. Push shortly on the on/off button to switch the receiver on.

The channel number is shown on the LCD display.

The channel can be changed with the channel selector.

Push it to the up- or down-position to increase or decrease the channel number. The highest channel number is automatically matched to the number of channels that has been set on the transmitter (see section 4.5.8).

A battery symbol is visible on the display when the batteries or the battery pack is almost empty.

An antenna symbol is visible when the receiver picks up a modulated infra red signal of adequate quality. During short interruptions in the reception, the receiver mutes the headphones output. When no adequate IR signal is detected for more than 1 minute (e.g. when a delegate leaves the conference room), the receiver automatically switches to stand-by mode.

The volume can be changed by moving the volume control up or down.

The receiver can be manually switched to stand-by mode by pressing the on/off button for more than 2 seconds.

When the headphone is disconnected, the receiver is automatically switched off. (A switch in the headphone connector disconnects the batteries.)

The infra-red receivers can operate with disposable batteries (2x AA-size alkaline cells) or with a rechargeable battery pack (not available yet).

Insert the batteries or the battery pack in the receiver with the correct polarity as indicated in the battery compartment. The battery pack has a separate connection cable which must be connected to the receiver.

When this connection is not present, the charging circuitry in the receiver will not work. This also prevents the unwanted charging of disposable batteries. The battery pack has a temperature sensor which prevents overheating during charging.

Note: Disposable batteries and battery packs at the end of their technical lives should be discarded with due care for the environment. When possible, take batteries to a local recycling station.

6.3 Reception test mode

The receivers can be switched to a test-mode to get an indication of the reception quality for each carrier separately. To activate the test-mode: Push the channel selector to the Up-position, press the on/off button and hold both for ca. 2 seconds.

When in test-mode, switch between carriers by using the channel selector. The receiver's display will shortly show the carrier number (0-7) and then a quality indication (00-90).

Note: When the receiver does not receive the selected carrier, it keeps displaying the carrier number and does not display its quality.

The reception quality can be assessed as follows:

Indication	Quality
00-39	Good reception. Very good audio quality.
40-49	Weak reception. Ticks in the audio.
50-90	No or bad reception. Poor audio quality.

The test mode is deactivated when the receiver is switched off.

6.4 Receiver headphones

The headphones connect with the receivers via a 3.5 mm (0.14 inch) stereo jack connector. Suitable headphone types are:

- DH 6021 Stereo headphones (recommended)
- Any other compatible type

7 CT 6056 Charging Tray

7.1 Description

The charging tray can recharge up to 56 receivers at once. The charging unit which is designed in a suitcase for portable unit contains the power supply with automatic mains voltage selection.

The charging electronics and a charging indicator LED are included in each receiver. The charging circuitry checks if a battery pack is present and controls the charging process.

Note: The charging tray is only intended to charge DR 60xx receivers with a BP 6001 battery pack. You cannot charge other receiver types with the CT 6056 charging tray, nor can you use other charging trays to charge DR 60xx receivers.

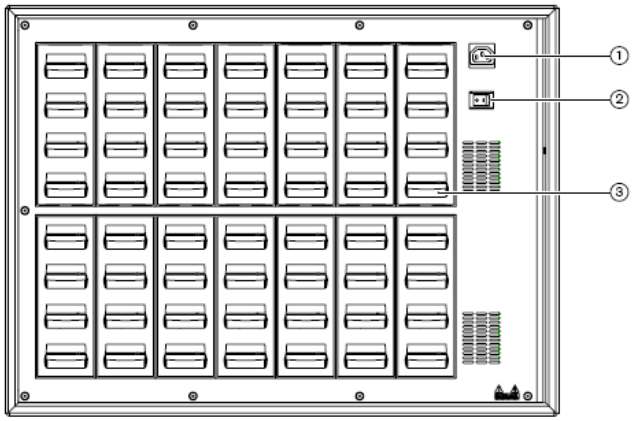


Figure 7.1-A Charging Tray, front view.

1. **Main Input -**Male Euro mains socket. The charging unit has automatic mains voltage selection.

   A mains cable is provided.

2. **Mains on/off switch**

3. **Receiver positions** - One charging unit can charge up to 56 receivers simultaneously

7.2 Charging procedure

Ensure that the charging tray is connected to the mains and that it is switched on. Place the receivers firmly in the charging compartments. The charging indicator LEDs on all receivers should illuminate. These LEDs indicate the charging status of each receiver:

LED colour	Charging status
Green	Charging completed.
Red	Charging in progress.
Red blinking	Error status. See chapter 6, Trouble shooting
Off	Charger switched off or receiver not properly inserted.

Notes

• It is preferred to switch on the charging unit before inserting the receivers. Receivers can be inserted or removed without damage while the charging unit is switched on.

• Charge the battery pack to full capacity before using them for the first time.

• The charger always applies fast charge during the first 10 minutes after inserting a receiver. Inserting the receiver multiple times with a fully charged battery pack should therefore be avoided, as this will damage the battery pack.

• Continuously charging the receiver will not damage the receiver or battery pack. Receivers can therefore safely be left in their charging positions when they are not used.

Notes continued:

• When the rechargeable battery pack is used, it is advisable to check regularly after three years that the batteries are not leaking.

If there is any sign of leakage or corrosion, replace the battery pack. Ensure that only the battery pack BP 6001 is used.

The battery pack has to be replaced at least every five years

.

8 Troubleshooting

In this chapter a simple fault-finding guide is given.

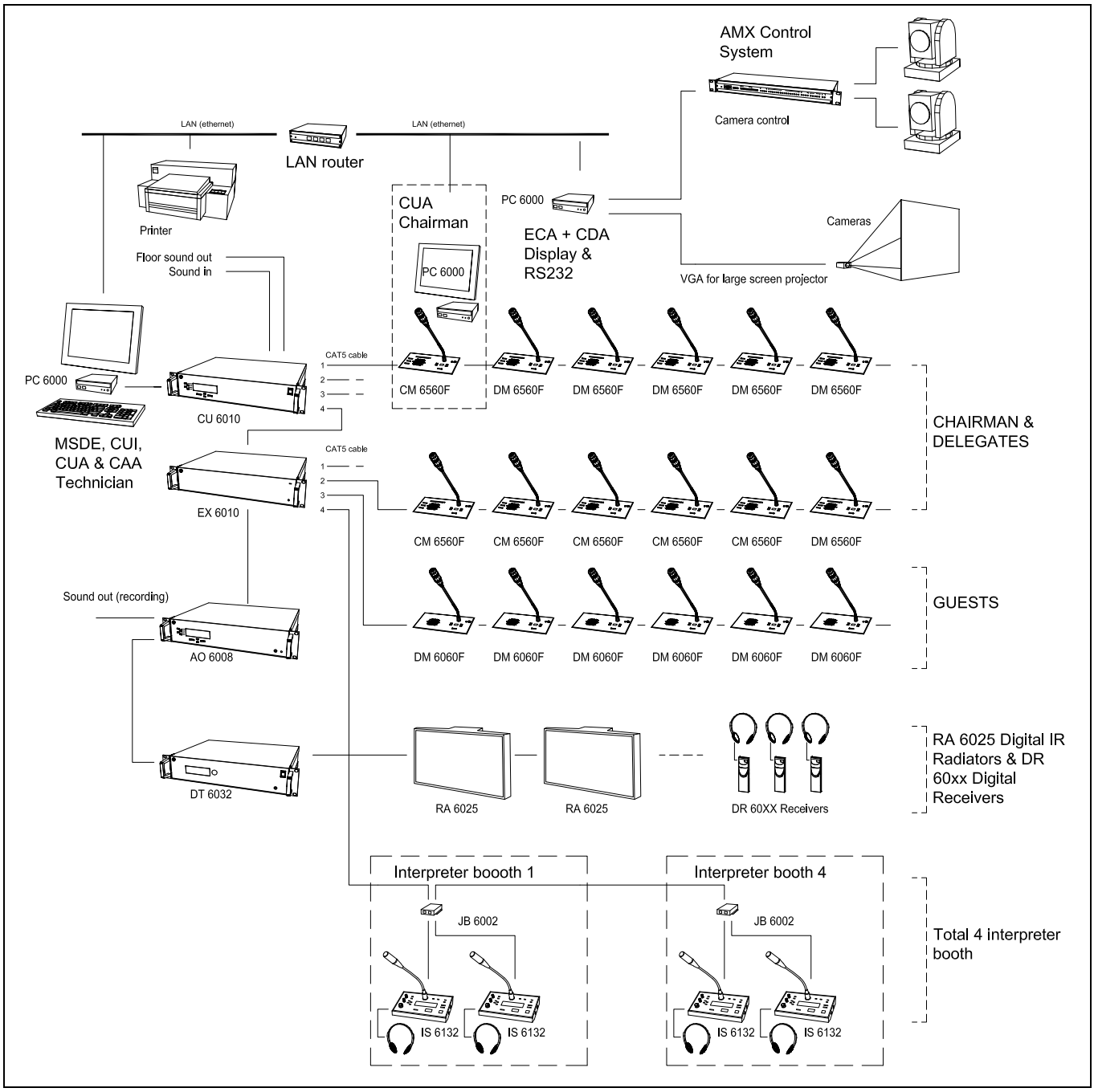
This is intended to be used to remedy the consequences of incorrect installation. If more serious faults or problems arise the installer should contact a qualified technician.

Transmitter display does not light up:	▪ Check that the mains supply to the transmitter is connected and that the transmitter is switched on.
Transmitter indicates “no radiators”:	▪ Ensure that connections to all radiators have been made correctly and that each radiator’s mains supply is connected and switched on.
Transmitter indicates “radiator fault”:	▪ Ensure that connections to all radiators have been made correctly and that each radiator’s mains supply is connected and switched on. ▪ Examine the radiator LEDs.
Emergency contact does not work:	▪ Check that the emergency contact is connected correctly. ▪ Check that the audio is connected according to the selected auxiliary input mode (menu 4H).
Red LED flashes and amber LED is on of one or both IRED panels of a radiator:	▪ IRED panel is in temperature protection mode. Check that the natural airflow around that radiator is not obstructed. If not so, replace the radiator.
Both red LED and amber LED are on of one or both IRED panels of a radiator:	▪ IRED panel malfunctions and the radiator should be replaced.
Infra red receiver fails to function properly:	▪ If disposable batteries are used, check whether the batteries have sufficient capacity and whether they are inserted with the correct polarity. ▪ If a battery pack is used, ensure that the battery pack is fully charged. ▪ Ensure that the headphone is connected properly. ▪ Switch the receiver on and check whether the display indicates a channel. ▪ Ensure that the receiver picks up sufficient IR signal and check whether the antenna symbol becomes visible. ▪ Enable the mini radiator (menu 4L) and check the receiver by holding it in front of the mini radiator of the transmitter. ▪ Ensure that the volume control is turned up. ▪ Set the transmitter in test mode and check whether the test

	tone is audible on the receiver. If the test tone is not audible, do the same test with other receivers. If all receivers do not work properly at that spot, check the coverage of the system (see section 3.6).
The charging indicator LED on the receiver is blinking:	▪ Check that the charging unit is used under the specified working conditions (see technical data). Check that the receiver contains a battery pack which is connected correctly. Ensure that the receiver is at room temperature and re-insert the receiver in the charging unit. If the charging indicator starts blinking again, replace the battery pack and check whether the problem is resolved.
Receiver discharges very quickly:	Replace the battery pack and check whether the problem is resolved.
Bad coverage:	Do the tests as described in section 3.6.

9 Typical schematics

The following schematic is showing a typical application with various units in the DCS 6000 system:



10 Technical Specifications

10.1 System Specification

Overall system characteristics

- Conforms to IEC 60914, the international standard for conference systems
- Conforms to IEC 61603 part 7, the international standard for digital infra-red transmission of audio signals for conference and similar applications

Transmission Characteristics

IR transmission wavelength	.....870 nm
Modulation frequency	Carriers 0 to 5: 2 to 6 Hz, according to IEC 61603 part 7, Carriers 6 and 7: up to 8 MHz
Protocol and modulation	DQPSK, according to IEC technique 61603 part 7

System Audio Performance

(Measured from the audio input of a transmitter to the headphone output of a receiver.)

Audio frequency response	20 Hz to 10 kHz (-3 dB) at Standard Quality 20 Hz to 20 kHz (-3 dB) at Premium Quality
Total harmonic distortion at 1 kHz	..... < 0.05%
Crosstalk attenuation at 1 kHz	..... > 80 dB
Dynamic range	..... > 80 dB
Weighted signal-to-noise ratio	..... > 80 dB(A)

Cabling and System Limits

Cable type	..... 75 Ohm RG59
Maximum number of radiators	..... 30 per HF output
Maximum cable length	900 m (2,970 feet) per HF output.

System Environmental Conditions

Working condition	..... Fixed, stationary or transportable
Temperature range	
- transport	-40 to +70 ℃ (-40 to 158 ℉)
- operating	+5 to +45 ℃ (41 to 113 ℉) +5 to +55 ℃ (41 to 131 ℉) for DT 6008 & DT 6032 +5 to +35 ℃ (41 to 122 ℉) for BP 6001
Maximum relative humidity	.....< 93%
Safety	According to EN 60065, CAN/CSA-E65 (Canada and US) and UL 6500 According to EN 60065, CAN/CSA-E65 (Canada and US) and UL 1419 for RA 6013 & RA 6025
EMC emission	According to harmonized standard EN 55103-1 and FCC rules part 15, complying with the limits for a class A digital devices
EMC immunity	According to harmonized standard EN 55103-2
EMC approvals	Affixed with the CE mark
ESD	According to harmonized standard EN 55103-2
Mains harmonics	According to harmonized standard EN 55103-1
Environmental requirements	Contains no banned substances as specified in UAT-0480/100 (e.g. no cadmium or asbestos)

Specifications are subject to change without notice.

10.2 IR Transmitters System Specification

10.2.1 DT 6008 and DT 6013 Infrared Digital Transmitter

Physical Characteristics

Mounting	Brackets for 19” rack mounting
	Detachable feet for free-standing use on a table top
Dimensions	425 (483) x 87 x 317 (357) mm (dimensions in brackets are incl. the 19" mounting brackets)
Weight	..... 4 kg (8.0 lbs)
Finish	.....Black with silver front

Electrical Characteristics

Asymmetrical audio inputs	+3 dBV nominal, + 6 dBV Maximal (+/- 6 dB)
Symmetrical audio inputs	+15 dBV nominal, + 18 dBV. Maximal (+/- 6 dB)
Emergency switch connector	....emergency control input
Headphone output	.....32 Ohm to 2 kOhm
HF input	Nominal 1 Vpp, minimum 10 mVpp, 75 Ohm
HF output	.....1 Vpp, 6 VDC, 75 Ohm
Mains voltage	....100 to 240 V, 50 to 60 Hz
Power consumption maximal	....55 W
Power consumption (standby)	....29 W

Specifications are subject to change without notice.

10.3 Radiators and Accessories

10.3.1 RA 6013 Medium and RA 6025 High Power Radiators

Physical Characteristics

Mounting	Suspension bracket for direct ceiling mounting
	Mounting plates for floor stands with M10 and 1/2" Whitworth thread
	WB 6000 Wall Mounting Bracket can be used for fixing radiator to wall surfaces
Dimensions (H x W x D)	RA 6013 without bracket:
	200 x 500 x 175mm (7.9 x 19.7 x 6.9 in)
	RA 6025 without bracket:
	300 x 500 x 175mm (11.0 x 19.7 x 6.9 in)
Radiator angle	0, 15 and 30° for floor-stand mounting
	0, 15, 30, 45, 60, 75 and 90° for wall/ceiling mounting.
Weight	RA 6013 without bracket:
	.....6.8 kg (15 lbs)
	RA 6013 with bracket:
	.....7.6 kg (17 lbs)
	RA 6025 without bracket:
	.....9.5 kg (21 lbs)
	RA 6025 with bracket:
	.....10.3 kg (23 lbs)
	.....Finish Bronze coloured

Electrical and Optical Characteristics

Number of IREDs	260 (RA 6013), 480 (RA 6025)
Total IR output at 20 ℃	11 Wrms 22 Wpp (RA 6013), 21 Wrms 42 Wpp (RA 6025)
Total optical peak intensity	12 W/sr (RA 6013), 24 W/sr (RA 6025)
Angle of half intensity	..... +/- 22°
HF input nominal	.....1Vpp, minimal 10 mVpp
Mains voltage	..... 90 to 260 V, 50 to 60 Hz
Power consumption	..... 100 W (RA 6013),
	..... 180 W (RA 6025)
Power consumption (standby)	..... 8 W (RA 6013),
	..... 10 W (RA 6025)
Max. operation temperature	45 degrees ambient, normal airflow
	Temperature protection will activate when the radiator is used far above maximum operating conditions.

10.3.2 WB 6000 Wall Mounting Bracket

Physical characteristics:

Dimensions	(H x W x D) 200 x 280 x 160 mm..... (7.9 x 11.0 x 6.3 in)
Weight	.....1.8 kg (4.0 lb)
Finish	..... Quartz grey

Specifications are subject to change without notice.

10.4 Receivers and Battery Packs

10.4.1 DR 6004, DR 6008 & DR 6032 Digital IR Receivers

Physical Characteristics

Dimensions	(H x W x D) 155 x 45 x 30 mm (6.1 x 1.8 x 1.2 in)
Weight excl. batteries/battery pack	75 g (0.16 lb)
Weight incl. battery pack	125 g (27 lb)
Finish	Charcoal with silver

Electrical and Optical Characteristics

IR irradiance level	4 mW/m2 per carrier
Angle of half sensitivity	+/-50°
Headphone output level at 2.4V	450 mVrms (speech at max. volume, 32 Ohm headphone)
Headphone output freq. range	20 Hz to 20 kHz
Headphone output impedance	32 Ohm to 2 kOhm
Max. signal-to-noise ratio	> 80 dB(A)
Supply voltage	1.8 to 3.6 V, nominal 2.4 V (battery voltage)
Power consumption at 2.4 V	15 mA (speech at maximum volume, 32 Ohm headphone)
Power consumption (standby)	< 1 mA

10.4.2 BP 6001 NiMH Battery Pack

Physical characteristics

Dimensions	(H x W x D) 14 x 28 x 49 mm (0.6 x 1.1 x 1.9 in)
Weight	50 g (0.11 lb)

Electrical characteristics

Voltage	2.4 V
Capacity	1100 mAh

Specifications are subject to change without notice.

10.5 Charging Trays

10.5.1 CT 6056 Charging Tray

Physical Characteristics

Dimensions (H x W x D):	230 x 690 x 530 mm (9 x 27 x 21 in)
Weight excl. receivers DR 60xx:	15.5 kg (34 lbs)
Weight incl. 56 receivers DR 60xx:	22.3 kg (49 lbs)
Finish	Charcoal with grey

Electrical Characteristics

Mains voltage	90 to 260 V, 50 to 60 Hz
Power consumption	270 W (56 receivers charging)
Power consumption (standby)	7 W (no receivers in the charging Tray)
Specified lifetime:	Minimum 2 years or 500 cycles (under normal conditions)

Specifications are subject to change without notice.

10.6 Connection details

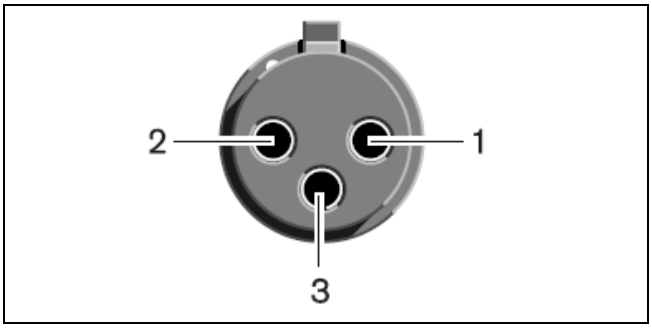
10.6.1 Mains cables

Blue	Neutral
Brown	Live
Green/Yellow	Earth/Ground

10.6.2 Audio cables

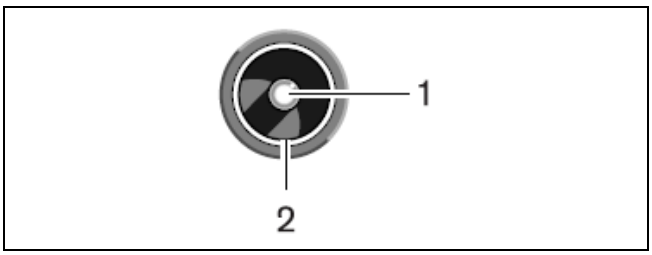
3-pole XLR connector (female)

Pin1	Earth
Pin 2	Signal +
Pin 3	Signal –



Cinch (RCA phone) connector (male)

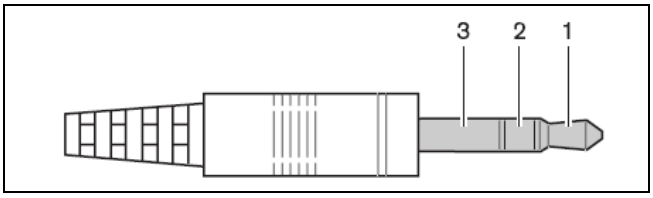
Pin 1	Signal +
Pin 2	Signal –



10.6.3 Earphones

3.5 mm Jack plug

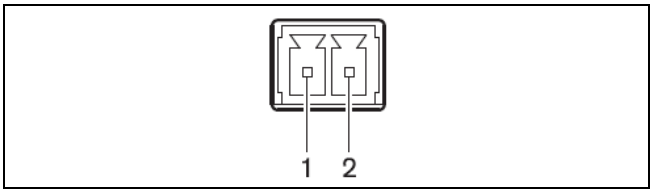
Tip (1)	Signal left
Ring (2)	Signal Right
Sleeve (3)	Electrical earth/screen



10.6.4 Emergency switch

Terminal block

Connect the emergency switch to pin 1 and 2.



Specifications are subject to change without notice.

10.7 Accessories (to be ordered separately)

RG59 Connection Cables

EC 6100-02 RG59 Cable 2 m 10 02 13205

EC 6100-05 RG59 Cable 5 m 10 02 13505

EC 6100-10 RG59 Cable 10 m 10 02 14105

EC 6100-20 RG59 Cable 20 m 10 02 14205

EC 6100-50 RG59 Cable 50 m 10 02 14505

Audio Cables

Cable – XLR to RCA phone 10 03 15001

Brackets & Stands

WB 6000 Wall Mounting Bracket 14 09 04035

FS 6000 Floor Stand.....14 09 04045

Transportation Boxes

Box for DR 6004, 08 or 32 (for 50 pieces) 14 10 58681

Box for one DT 6008 or DT 6032 .....13 11 05527

Box for one RA 6013 .....14 09 05502

Box for one RA 6025 .....14 09 05503

Headphones

DH 6021 Stereo headphones 14 11 03055

Specifications are subject to change without notice

10.8 Guaranteed rectangular footprints

			RA 6013 at full power				RA 6025 at full power			
number of carriers	mounting height [m]	mounting angle [degrees]	area A [m2]	length L [m]	width W [m]	offset X [m]	area A [m2]	length L [m]	width W [m]	offset X [m]
1	2.5	0	814	37	22	8,5	1643	53	31	11,5
	5	15	714	34	21	8	1440	48	30	10,5
		30	560	28	20	5	1026	38	27	6,5
		45	340	20	17	2	598	26	23	3
		60	240	16	15	-0,5	380	20	19	0
		90	169	13	13	-6,5	196	14	14	-7
	10	15	770	35	22	10	1519	49	31	12,5
		30	651	31	21	6	1189	41	29	8
		45	480	24	20	2,5	837	31	27	3
		60	380	20	19	-1,5	600	25	24	-1
		90	324	18	18	-9	441	21	21	-10,5
	20	30	609	29	21	12	1364	44	31	11
		45	594	27	22	6	1140	38	30	4,5
		60	504	24	21	0,5	899	31	29	-1,5
		90	441	21	21	-10,5	784	28	28	-14
2	2.5	15	360	24	15	5	714	34	21	7
	5	15	375	25	15	6	714	34	21	8
		30	294	21	14	4	560	28	20	5
		45	195	15	12	1,5	340	20	17	2
		60	156	13	12	-1	240	16	15	-0,5
		90	121	11	11	-5,5	169	13	13	-6,5
	10	30	330	22	15	5,5	651	31	21	6
		45	285	19	15	2,5	480	24	20	2,5
		60	224	16	14	-1	380	20	19	-1,5
		90	196	14	14	-7	324	18	18	-9
	20	60	255	17	15	2,5	504	24	21	0,5
		90	225	15	15	-7,5	441	21	21	-10,5
4	2.5	15	187	17	11	4	360	24	15	5
	5	15	187	17	11	5	375	25	15	6
		30	165	15	11	3,5	294	21	14	4
		45	120	12	10	1,5	195	15	13	1,5
		60	90	10	9	-0,5	156	13	12	-1
			81	9	9	-4,5	121	11	11	-5,5
	10	45	154	14	11	3	285	19	15	2,5
		60	132	12	11	0	224	16	14	-1
		90	100	10	10	-5	196	14	14	-7
	20	90	100	10	10	-5	225	15	15	-7,5
8	2.5	15	96	12	8	3	187	17	11	4
	5	15	84	12	7	4,5	187	17	11	5
		30	88	11	8	3	165	15	11	3,5
		45	63	9	7	1,5	120	12	10	1,5
		60	56	8	7	-0,5	90	10	9	-0,5
		90	49	7	7	-3,5	81	9	9	-4,5
	10	60	64	8	8	1,5	132	12	11	0
		90	64	8	8	-4	100	10	10	-5

(The mounting height is the distance from the reception plane and not from the floor).